PEST CONTROL

SEPTEMBER 1955

Home-Invading Mites Are Explored By Dr. Baker In Article Beginning Pg. 9

Mills Traces History Of Anticoagulants . . Pg. 14

Termite, Sanitation and Business Sessions Will Highlight NPCA Meeting At Denver . . . Pg. 24

Lauds NPCA Convention Opportunity . . . Pg. 26

EDB and Methyl Bromide Fumigation Queries Are Answered . . . . Pg. 28

Are Termites Migrating Northward? . . . Pg. 28

Gibson Ends Article On Environmental Sanitation In Food Plants . Pg. 35

Serviceman sprays dog kennel adjacent to home to destroy ticks and mites which might be harboring there. Dogs sometimes act as hosts for ticks, but more important, rats and mice attracted by scraps of food inside kennel are primary hosts for certain mite species and food infesting mites have fondness for dog food. Mites often leave hosts and invade homes causing concern to housewives. Here, windows at left provide mites easy access to dwelling but preventive chemical application such as this will usually stop most of the trouble. Photograph through courtesy California Spray Chemical Co.

Since 1933

Magazine of the Urban and Industrial Pest Control and Sanitation Service Industries for Over 22 Years

FMC CHEMICALS

THE PLAIN TRUTH
ABOUT PIPERONYL BUTOXIDE

It's one of the most amazing insecticidal synergists to come to light in the laboratory in recent years.

In combination with pyrethrum, *piperonyl butoxide* forms the *versatile* Pyrenone* concentrates — steps up the killing power of pyrethum at least 10 times. *Butoxide* itself has definite insecticidal properties. Yet it is virtually *non-toxic* to man or warm-blooded animals. It is equally as safe as pyrethrum, if not more so.

STABILIZES PYRETHRUM

Piperonyl butoxide also stabilizes pyrethrum in these two important ways:

1. **Reduces deterioration of pyrethrum by screening out ultra-violet light.**
2. **Acts as an acid acceptor and thus retards decomposition and polymerization of pyrethrum.**

Net result of this two-way stabilizing action is to increase the shelf-life of the end product — and to make it more effective in practical applications against insects for *longer* periods of time.

READILY SOLUBLE

Readily soluble in all common organic solvents, *piperonyl butoxide* is also a solvent in its own right. It minimizes, and often makes unnecessary, the use of other solvents and aromatics which may impart undesirable odors to end products. And because this superior synergist is an ether, *butoxide* is stable to the action of other chemical agents and exposure conditions—such as, heat, light and atmospheric changes.

For complete technical data . . . typical formulations for specific end uses . . . and sample label statements, write the nearest Fairfield Chemical Division office, Food Machinery and Chemical Corporation. Sales Headquarters: 420 Lexington Avenue, New York 17, N. Y. Branches in Principal Cities.

*Reg. U. S. Pat. Off., F.M.C.

Pyrenone

FAIRFIELD CHEMICALS
TRADE MARK

fmc FOOD MACHINERY AND CHEMICAL CORP.

Chemical Divisions

OHIO-APEX *Plasticizers and Chemicals* **WESTVACO CHLOR-ALKALI** *Alkalis, Chlorinated Chemicals, Carbon Bisulfide* **FAIRFIELD CHEMICAL** *Insecticides and Organic Chemicals*
NIAGARA CHEMICAL *Insecticides, Fungicides and Industrial Sulphur* **BECCO CHEMICAL** *Peroxygen Chemicals* **WESTVACO MINERAL PRODUCTS** *Phosphates, Barium and Magnesium Chemicals*

We're so proud we're bustin' our buttons... because

B & G Professional Sprayers ARE FOUND IN THE BEST PLACES!

FULLY GUARANTEED

You'll find the B & G label well represented in the more than 60 different kinds of pest control equipment Orkin operators use!

ORKIN *"Serving 47 Million People"*

B & G Serves Scores More PCO's In Spreading Sanitation . . . . . Protecting Health

A partial list of B & G Customers

Ardee Maintenance Corp.
Corley Pest Control
Getz Exterminating Co.
Harder Ext. Co.
Illini Pest Control
L. A. Moore Co.
Lien Chemical Co.
Lystad & Redick
Mac Griffin, Inc.
Montgomery Pest Control
New England P. C.
Nolen Economy Ext.
Oser Exterminating
Paramount Exterminating
Rose Exterminating
Smithereen Co.
Theo. Meyer Estate
Vogel-Ritt. Inc.
Western Ext.
Wil-Kil Pest Control

- **LIGHT WEIGHT, STAINLESS STEEL TANK**
- **ELECTRICALLY WELDED SEAMS**
- **QUICK, SURE SHUT-OFFS**
- **TROUBLE-FREE ALL BRASS FITTINGS**
- **OIL AND CHEMICAL RESISTANT HOSE**
- **PRECISION SPRAY PATTERNS**

ONE GALLON
One gallon stainless steel tank, brass pump unit, adjustable carrying strap, brass shut-off valve, 4-ft. hose unit, 9" angled brass extension, and fan pattern nozzle. Model 100-S $24.50

With Versatile Multeejet Nozzle
Have four different types of spray patterns in one nozzle simply by rotating tip and tightening retainer ring with finger pressure.
Model 104-S $27.23

TWO GALLON
Two gallon stainless steel tank, brass pump unit, adjustable carrying strap, brass shut-off valve, 4-ft. hose unit, 18" angled brass extension, and fan pattern nozzle.
Model 200-S $29.75

With Versatile Multeejet Nozzle
Four types of spray patterns in one nozzle. Simply rotate tip and tighten retainer ring with finger pressure.
Model 204-S $32.50

Manufacturers and Distributors of Pest Control Products

B & G COMPANY

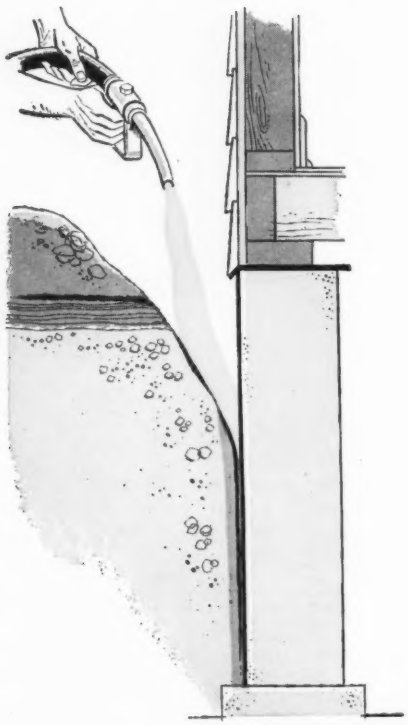
Plumsteadville, Penna.

"Serving the Pest Control Industry"

dieldrin

...the powerful, modern insecticide...

NOW ACCEPTED FOR TERMITE CONTROL



tests show dieldrin offers long-lasting protection, effective control

Now pest-control operators can offer customers dieldrin . . . the modern insecticide for effective, long-lasting termite control. Dieldrin has been tested and accepted for termite treatment.

long-lasting effectiveness

Dieldrin is famous for its long residual action and chemical stability . . . even in soil with high alkaline or acid content. Current information shows it will remain effective in *any type of soil for years!* Dieldrin is a more effective means of termite control than structural barriers, because dieldrin kills termites if they eat, touch, or breathe it.

greater assurance for your customers

Now you can offer your customers better protection against termites over a longer period of time. In many areas, your customers already know about dieldrin's effectiveness on soil insects that attack lawns and ornamentals.

simple procedure

Homes can be protected from termites easily and quickly with an application of dieldrin along foundations, according to label instructions.

Dieldrin is available from most insecticide formulators.

SHELL CHEMICAL CORPORATION

AGRICULTURAL CHEMICALS DIVISION

460 Park Avenue, New York 22, N. Y.

When Writing to Advertisers Please Mention PEST CONTROL

Pesticide-Use Injustices Affecting the PCO

Legislation for pest control operators has done much to elevate our industry, but in many cases it restricts professionals from using chemicals available to any Tom, Dick and Harry who can do with them as they please.

PCOs are frequently forbidden to use insecticides lawmakers think too toxic to be sprayed in places where people congregate, but the free sale of those very same pesticides over-the-counter in retail outlets is ignored.

Why, for example, should there be any restriction on the PCO application of chlordane if the housewife can buy a can of the stuff anywhere and use it as she wishes? Arborists, aerial sprayers, lawn specialists in most states do not come under the laws which regulate PCOs. Why should a pest control firm be forbidden to use or sell Cyanogas without having a special fumigator's license, when the do-it-yourselfer can pick up a can at the corner hardware and gas his own yard and that of his neighbor's without any restriction whatever?

And why should expensive insurance coverage be required of PCOs by some manufacturers before these operators can use their products, when municipal, state, and Federal governments do not have to meet the same requirements?

If chemicals are safe enough to be granted approval by our Federal government for general sale, no use-restrictions should be placed on PCOs. Label instructions often tell the consumer he should not use this or that product in certain places, but is anyone looking over his shoulder to see that he follows the instructions? Why should PCOs be barred from using these pesticides?

One of two things should be done. Either professional PCOs, who have proved they know what they are doing, should have the right to use any chemical that is available to the general public, in addition to those which are limited to PCO use, or laws regulating the use of pest control chemicals should remove from consumer-sale shelves products for which a PCO must have a special license to use.

Something should be done to correct the injustices of present pesticide-use limitations affecting PCOs.

James A. Nelson

Editor

PEST CONTROL

EVERY MONTH SINCE 1933

JAMES A. NELSON
Editor

H. B. WILSON
Assistant Editor

R. J. HOFFER
Circulation Manager

KARL HASSLER
West Coast Representative

Volume 23 **SEPTEMBER 1955** **No. 9**

In This Issue:

Mites As Household Pests
By Dr. E. W. Baker 9

How Anticoagulant Rodenticides Were Developed
By Ernest M. Mills 14

Rodent-Free Bird Feeder Is Cheap, Easy To Build 19

NPCA Convention News 24

Opportunity-Plus
Guest Editorial by Robert R. Schendel 26

Hassler Answers Methyl Bromide
And EDB Fumigation Queries 28

Northward Termite Migration?
Borer Lines by Dr. Thomas E. Snyder 28

Environmental Sanitation in the Control of Pests
Of Public Health Importance, Part II
By William C. Gibson 35

Termites On A Wet Tin Roof
Notebook by Walter S. Buswell, Jr. 44

Look Alikes: 9, Larder Beetle and Incinerator Beetle
Primer by Dr. Marion E. Smith and Hsiu-fu Chao 47

Letters 6
News 38
Calendar 43
Infestation Report 46
Classifieds 49
Advertisers 49
Pestales 50

Cooperating with NATIONAL PEST CONTROL ASSOCIATION

Published Monthly by
TRADE MAGAZINES, INC.
Publication Office: 324 N. State Street, Painesville, Ohio
Please send all correspondence to
Editorial and Advertising Offices
1900 Euclid Avenue, Cleveland 15, Ohio

Single Copy Price: 50 cents. **Subscription Rates:** U. S. and possessions, Canada and members of the Pan-American Postal Union, 1 year, $5.00; 2 years, $8.00. All other foreign subscriptions, 1 year, $6.00; 2 years, $10.00. **Change of Address:** Three weeks advance notice is necessary for change of address. Both old and new address must be given. Post Office will not forward copies. Entered as Second Class Matter at the Post Office at Painesville, Ohio, under the act of March 3, 1879.

Letters

Asks For Weed Control Literature

I am deeply interested in the removal and control of weeds. Could you recommend the most practical book on this subject and where to obtain it? The authors and publisher aren't important to me, just so the book is concise and practical.

Philip J. Bernhard
Ogdensburg, N. Y.

Pest Control *sent Mr. Bernhard's request to the Department of Agriculture's Weed Investigations Section at Beltsville, Md. Here is the reply from Marion W. Parker, head of the section.*

There are a number of excellent sources of information on weed control. State experiment stations will be able to furnish recommendations for control of specific weeds that will be particularly valid for individual areas and conditions. More generalized treatment of the subject of weed control will be found in the following widely used books.

Ahlgren, G. H., Klingman, G.C., and Wolf, D. E. Principles of Weed Control. 1951. John Wiley & Sons, Inc., N. Y.

Robbins, W. W., Crafts, A. S. and Naylor, R. N. Weed Control. A textbook and manual. Second edition. 1952. McGraw-Hill Book Co., Inc., N. Y.

Opposes PCOs Becoming Sanitation Consultants

I have read with considerable interest the comments from NPCA regional vice presidents relative to the expansion of sanitation consultation services by pest control operators (June '55, p. 31).

Has it ever occurred to you and to some of your readers that the field of true sanitation consultation, particularly in the food industry, requires an expert with many years of education and public health experience? It appears to me to be somewhat audacious to even insinuate that the average employee of a pest control operator would either have the ability or the background to suddenly become a qualified milk and food sanitation consultant.

It would be no more ludicrous to ask clerks in drug stores to begin to prescribe and diagnose cases of illness for their customers. When one is sick, whether it is an internal human sickness, or a sickness of improper application of sound public health principles, a specialist in the field should be called in to not only diagnose the disease, but to recommend the proper methods for its control and possible abatement.

If the pest control industry is interested in offering to its clients sanitation consultation without "strings" then it would appear to me that it would be more apropos for them to call in a qualified milk and food sanitation consultant. He is thoroughly capable of preparing an accurate and thorough review of the existing and potential sanitation problems, along with suggestions for improvement and establishment of a plant sanitation program.

Harold Wainess
Harold Wainess & Associates
Milk, Food and Industrial
Sanitation Consultants
Chicago, Illinois

Says Khapra Beetle Not Native to Malaya

In the recent numbers of *Pest Control* (November 1954, p. 9; January 1955, p. 24; and April 1955, p. 24) it is stated that the khapra beetle *(Trogoderma granarium)* is native to Malaya. Although it is true this beetle was found last year on one occasion in one godown outside Kuala Lumpur, this was a new record. In the note in our Malayan Agricultural Journal, (Vol. 37, (4), p. 232) recording this, it was published under the heading of a stored product pest new to the country.

I should be grateful if you could find space to show that this was an isolated case of an introduced insect which did not establish itself nor has been found elsewhere in Malaya.

R. A. Lever
Senior Entomologist
Department of Agriculture
Kuala Lumpur,
Federation of Malaya

Pest Control *querried Dr. Richard T. Cotton, of the U. S. Department of Agriculture's Stored Products Insect Section, and asked if reader Lever were correct. Here is Dr. Cotton's reply:*

Dr. H. E. Hinton in his *Monograph of the Beetles Associated with Stored Products*, published in 1945, gives India, Ceylon and Malaya as the home of the khapra beetle. All other localities given are countries into which it has been introduced.

Since the species was described by Everts in 1898 I would presume that he is responsible for the original reference to its place of origin.

In our articles on the khapra beetle we have merely quoted world authorities on the matter of its distribution. Early accounts of this insect state that it is cosmopolitan in distribution.

Kudos for July, August, Issues

I wanted to tell you what a mighty complete and mighty interesting issue I found the July copy to be, with its complete story on equipment for the many different pest control operator jobs.

Can't help but think back over the years to realize what a tremendous change and improvement there has been in this magazine. It truly is the spokesman for the pest control industry and it certainly brings PCOs a tremendous fund of helpful information for their work and their problems.

D. P. Lewis
Sprayer & Duster Division
H.D. Hudson Manufacturing Co.
Chicago, Illinois

These past two issues of *Pest Control* (July and August) have been terrific. You've been outdoing yourself. Keep up the good work.

Bob Patrich
Sanitation Specialists
New York City

Pest Control welcomes expressions of opinions from its readers. Send ideas and comments as briefly as possible to James A. Nelson, Editor, Pest Control, 1900 Euclid Avenue, Cleveland 15, Ohio.

Announcing...

INSECTICIDE CONCENTRATE

for the control of the

GERMAN COCKROACH

More than a year of extensive experimental work in laboratory, field and commercial applications has resulted in the development of an insecticide concentrate (MALRIN) and best procedures for the control of the German cockroach *(Blatella germanica)*. New and completely different, MALRIN is quick killing, safe and economical to use.

- **CONTROL:** Both *initial reduction* and *residual control*. Controls *resistant* and *non-resistant* German roaches and houseflies, as well as many other types of insects.
- **MAMMALIAN TOXICITY:** One of the safest materials for PCO use.
- **ODOR:** Very slight insecticide odor.
- **FORMULATIONS:** 55% MALRIN Emulsifiiable Concentrate.
  55% MALRIN Oil-Base Concentrate.
- **COST:** Approximately 40 cents for the average commercial job (restaurant, store, etc.).

Another guaranteed product of

AGRICULTURAL SPECIALTIES

10219 DENTON DRIVE DALLAS, TEXAS

Write for complete information . . .

rax *warfarin*

sure death to rodents

More than three years of extensive usage in every phase of Rodent Control has convinced the Pest Control Industry that RAX (.5% Warfarin) has no equal for positive control of rats and mice.

Repeated use of RAX (Warfarin) means repeated profits for you. No other rodenticide can match the performance, economy, and safety of baits made from RAX (.5% Warfarin).

Our new RAX POWDER (.5% WARFARIN) brochure is just off the press. Write for your copy today.

Try the Prentiss rodent killing combination — RAX POWDER (.5% Warfarin) and the DE-RATTER DE-MOUSER, permanent bait station. Send today for complete information on RAX and the DE-RATTER DE-MOUSER.

Use these other PRENTISS PERFORMANCE-TESTED PRODUCTS

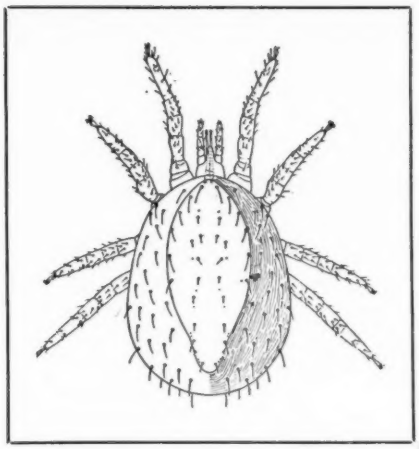
- PYRETHRUM
- ALLETHRIN
- PYRONYL CONCENTRATES
- LINDANE
- D. D. T.
- CHLORDANE

rax *warfarin*

PRENTISS DRUG & CHEMICAL CO., Inc.

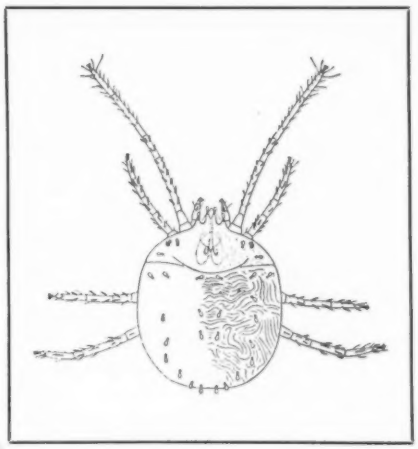
110 William Street, New York 38, N. Y.

9 South Clinton Street, Chicago 5, Ill.



Northern fowl mite (at left) usually is found infesting bird nests around buildings, but sometimes this pest invades houses in large numbers & bites man.

Clover mite (at right) is a scourge of housewives and PCOs. Normally a plant and shrub feeder, the clover mite will migrate into homes during fall months.



MITES As Household Pests[1]

THE MEDICAL IMPORTANCE of mites to man was forcibly brought to our attention during the last war when scrub typhus ranked next to malaria in the South Pacific in causing disease and death among the troops. One incident still remembered was the construction of a Carrier Aircraft Service unit on the tiny island of Ponam. Scrub typhus, carried by the chigger mites to the Seabee personnel constructing the base, caused so many casualties that it was necessary to send in many replacements to complete this relatively simple job.

Household mites have always been with us to a more or less degree although many people have had no experience with them. The outbreak of rickettsialpox a few years ago focused attention to the mite carriers as household pests. Another problem is the increasing number of cases of plant feeding forms invading homes. One way or another, people are becoming aware of mites.

• Related to Spiders, Scorpions

Mites, which are related to spiders, daddy-long-legs, and scorpions, may be easily recognized in that they possess no distinct body segmentation — the head, thorax, and abdomen commonly found in other arthropods. They are usually small, some being less than 1/200 of an inch long, although a form from the southwestern United States may reach half an inch in length. The related ticks, however, may become quite large when engorged. Mites are not closely related to the insects, which may explain the difference in reactions to control methods.

Very few of the mites have been named. About eight or nine thousand have been described, and this probably includes less than 5% of the total number. There are probably fewer species than insects, but in actual number of individuals they probably surpass insects.

Very little is known about the biology of most mites. Only a few of those of economic importance have been studied, usually in relation to control. They fall into three broad groups, parasites, plant feeders, and predators, the latter being beneficial by feeding upon the plant feeders.

Few workers studied mites before the past war. Now, due to increased interest because of the disease carriers and increasing importance in agriculture, many people are now in this field. Courses in Acarology are being offered at the University of Maryland, University of Missouri, University of Kansas, and the University of California.

• Damage Less Than Insects

In many cases the importance of the mites overshadows that of the insects, but as a whole the mites as disease carriers and agricultural pests do less damage than do insects. Hundreds of eriophyid mites on a leaf may produce no observable damage, but an equal number of insects would quickly kill the host. However, when the mite problem is acute, it can cause as much or more trouble than the insect. Damage is often recognized after it is too late for control measures.

Mites as household pests are probably of minor importance when compared with cockroaches, ants, and flies, but to the individual concerned the problem is acute and of importance. The mental agony which seems to affect many people when mites are found in their homes may be due to the small size and lack of knowledge concerning them.

• 5 Groups of Household Mites

Household mites are divided into groups by habitats rather than by taxonomy in this article. This grouping not only suffices for the separation biologically, but also indicates the methods of control* needed. They fall into five groups: (1) nest-inhabiting

[1] Given at the Chemical Specialties Manufacturers Association Meeting, New York, December 6-8, 1954. A more detailed account of the importance, biology, and control of these and other parasitic mites is being presented in a Manual of Parasitic Mites of Importance to Man and Domestic Animals which will soon be in press.

* In cases in which control methods are mentioned, these are recommendations that have been made by various workers. They are not to be interpreted as recommendations of the author or of the U. S. Department of Agriculture.

By DR. E. W. BAKER, U. S. National Museum, Washington, D. C., known authority on Arachnids.

mites parasitic on birds and rodents and occasionally biting man; (2) mites parasitic on animals other than man (not household) and occasionally biting man; (3) mites parasitic on man; (4) plant-feeding mites; and (5) food-infesting mites.

• Nest-Inhabiting Mites

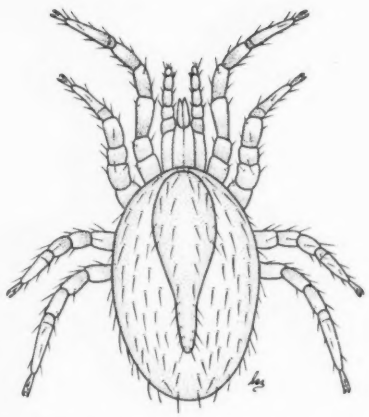
The nest-inhabiting forms include the Tropical Rat Mite, **Bdellonyssus bacoti** (Hirst), the Northern Fowl Mite, **Bdellonyssus sylviarum** (C. & F.), House Mouse Mite, **Allodermanyssus sanguineus** (Hirst), and the Chicken Mite, **(Dermanyssus gallinae** (Degeer).

All these live within the nests of their hosts and feed upon the hosts when hungry. They cannot develop upon man. But when the hosts leave their nests or are killed, the mites swarm out looking for food, and it is at this time that people become aware of the infestations. Although they may bite man, causing a dermatitis which may become secondarily infected by scratching, they must feed upon their primary hosts or will die within two or three weeks. These nest-inhabiting forms appear to be similar but are easily separated by differences in mouth parts, setation, and structure of the dorsal and ventral plates.

Tropical Rat Mites are the most important pest in this group. They bite man readily and cause a mild or even painful dermatitis. They have been found to be infected with murine typhus, rickettsialpox, and tularemia, but apparently play little or no part in the transmission of these diseases.

Older dwellings, offices, and warehouses are likely to be infested with rats, and when these animals are controlled mites will leave the nest in search of food, and bite man. Nests in walls may be a source of mites even though rats are not killed. Control of rat mites is primarily directed against the rats. Suggested mite controls include the use of residual sprays containing DDT, lindane, chlordane, or pyrethrum. The use of Dimite and Aramite has also been suggested.

Northern Fowl Mites and the Chicken Mites are found infesting nests of birds roosting around homes and buildings. Both will invade homes, especially after the young birds have left the nests.



Tropical rat mite bites man readily and can cause painful dermatitis. Mite must feed upon primary host within 2-3 weeks or die.

The Northern Fowl Mite appears to be the most commonly encountered species of the two. It has been found to be infected in nature with western equine encephalomyelitis but its role in the transmission of this disease does not appear to be important. It will bite man occasionally but it is not as serious a pest as is the rat mite. Elimination of the birds and chemical control as practiced against the Tropical Rat Mite is recommended.

The Chicken Mite can also cause a mild dermatitis on man. It has been found infected with the St. Louis encephalitis virus, but its role in the transmission of this disease appears to be negligible. This species, when abundant, can cause the death of birds. Controls are similar to those practiced against the Northern Fowl Mite.

Medically, the House Mouse Mite is the most important of the group, although it appears to be more or less restricted to the northeastern United States. This species is a carrier of rickettsialpox, a relatively mild disease, from mouse to man. Elimination of House Mouse Mites is dependent upon control of the mice. DDT, lindane, chlordane, Dimite, and Aramite are suggested controls against mites in the home. Pyrethrum and Allethrin may prove to be effective.

• Mites Parasitic On Animals

In the second group, those parasitic on animals other than man which are not household pests, are the chiggers or larval Trombiculidae, and the Hay Itch Mite, **Pyemotes ventricosus** (Newport). Many species of chiggers cause dermatitis to man, and a few transmit a rickettsial disease, Scrub Typhus, in certain areas of the world.

The chigger is the six-legged larva which is commonly parasitic on rodents, birds, and reptiles; man is only an incidental host. Chiggers feed upon lymph and epidermal tissues which are partially digested by the secretion of salivary fluids into the host's skin. Feeding tubes reaching into the flesh are formed by the reaction of the body fluids of the host with the salivary fluids of the mites.

Nymphs and adults are predaceous upon eggs of small arthropods. Whereas the larvae are small and simple, with a characteristic dorsal plate, the nymphs and adults are large, strongly haired, and usually figure-8-shaped.

Chiggers are not truly household pests but are to be found in lawns and yards of homes, especially in country or urban areas which have habitats attractive to the small rodent hosts. Outdoor fireplaces, because of food made available to mice, have led to infestations of chiggers in many cases. Other favorable habitats are margins of bodies of water, swampy areas, and berry patches.

Control of these mites is also a control against the hosts. Natural control measures eliminate the habitats favorable to the chiggers and their native hosts. Removal of scrub and vegetation, and farming and subdivision development tends to reduce chigger populations in many localities.

Area control by chemicals has been practiced. Sulfur dust was originally used but did not give a high degree of control. Lindane, chlordane, toxaphene, dieldrin, aldrin, and Dimite have proved effective and have been recommended. Personal protection, either by applying a chemical to the skin or clothing, has given excellent results. Dimethylphthalate, Dibutylphthalate, and Benzyl benzoate, all were highly effective when used in either manner.

The Hay Itch Mite is a parasite of insect larvae rather than of vertebrates, and usually is a farm problem since it is commonly found on insects affecting wheat. Workers who handle hay, wheat, straw, and grass which has been infested with insect larvae para-

PENTA
CHLORDANE
DIELDRIN
LINDANE
MALATHION
BENZENE HEXACHLORIDE

ARAMITE
SODIUM ARSENITE
PYRETHRINS
DDT
FLY SPRAYS
WEED & BRUSH KILLERS

Whatever You Need... You Can Get It Here!

Everything In Chemicals For The PCO!

SALES AIDS TO HELP YOU

TERMITE INSTRUCTION MANUAL

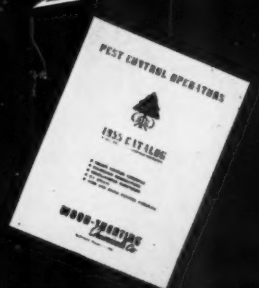
Filled with helpful information on termite treating procedures. Get one for your service men. FREE to customers.

MAILING PIECES

Powerful sales-building folder. Imprinted with your name and address at nominal charge.

NEWSPAPER MATS

Inquiry-getting, sales-producing ads that build business for you. NO CHARGE! Write for proof sheet.



WRITE FOR COMPLETE PRICE CATALOG

WOOD-TREATING CHEMICALS CO.
5137 Southwest Avenue • St. Louis 10, Missouri

WAREHOUSES: Atlanta • Birmingham • Charlotte • Dallas • Jackson, Miss. • Los Angeles
Oakland, Calif. • Portland, Ore. • Roanoke, Va. • St. Louis • Spokane • Tampa

WOOD TREATING

If you have any pest control problems, Wood-Treating will be glad to give you the benefit of their years of experience without obligation. Write!

sitized by these mites become infested. People who sleep on hay or straw mattresses may also become infested.

These mites may be recognized by the naked eye since the gravid females become enormously distended so as to appear like small pearly beads. Eggs hatch within the mother and the mites develop to maturity within the mother's body. Males emerge first through the genital opening and cluster about waiting for the females to emerge so mating can begin. If hungry, the male feeds upon the mother. The fertilized female then searches out a host upon which to feed and the cycle begins over again. Man is an incidental host. In a related species the mites mature and mate within the mother who then bursts to free the adult children.

Hay Itch Mites became important at the Indiana State Fair where infested straw in the animal barns was the source of mites whose bite caused a dermatitis in at least 1700 cases. Usually the dermatitis is mild and does not reach the attention of a physician, but in cases where the bites are numerous treatment has been given to stop the itch and to prevent scratching and secondary infections. Fever, vomiting, backaches, and general malaise may also result.

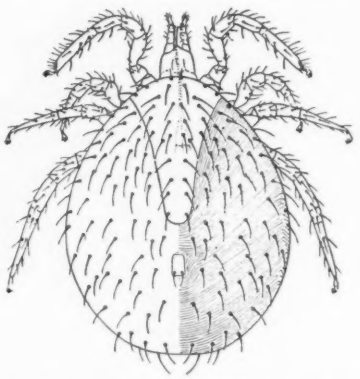
Control when needed can be obtained by fumigation of the straw. Sulfur and ethylene dibromide have been effective, as has a combination of pyrethrins and piperonyl butoxide. Repellents such as used against chiggers should prove effective.

• Mites Parasitic on Man

The third group, mites parasitic on man, includes the well known Itch or Scabies Mite, **Sarcoptes scabiei** (Degeer), and the Pore Mite, **Demodex folliculorum** Owen. These two are medical rather than household problems, but because of their place in the history of man they are included here.

The Itch Mite becomes a problem when social conditions cause crowding, usually when too many people sleep in a bed as happened in Europe during the war. Close body contact is necessary for the transmittal of these mites. During the last war, many soldiers returning from Europe were found to be infested with these mites. They burrow into the horny layer of the skin, causing an intense itching, especially at night.

Control is relatively simple. An emulsion of Benzyl benzoate can be painted on the body, one treatment usually being sufficient. Lindane and Temosol have also been used with success.



House mouse mite is carrier of rickettsialpox. However, this pest is more or less restricted to northeastern part of the United States.

Pore Mites occasionally cause itching pimples or dermatitis on man on various parts of the body, but usually they are present without being suspected. The most common site of infestation is the pore area of the nose. The body structure of the mites is wormlike, hairless, and short-legged, adapted to live their entire life cycle in the pores. Transfer of the mites from man to man may take place in early childhood, perhaps during breast feeding. In other animals related species of mites can cause serious damage and even death. A salve containing sulfur and Peruvian balsam is the standard treatment for cases occurring in man.

• Clover Mites Plant-Feeders

The Plant-Feeding mite which can be considered a household pest is the Bryobia or Clover Mite, **Bryobia praetiosa** Koch. This species normally feeds on grasses and shrubs and becomes a pest when the host plant dries out in the fall and the mites migrate in search of a place to hibernate. During this period and on warm winter days they may be seen crawling by the thousands on window sills and walls in the homes. They do no damage but will spot the walls if crushed. Many people become quite excited when finding these, far out of proportion to the damage they do. Control methods consist of spraying the host plants and use of residual sprays indoors.*

• Food-Infesting Mites

Food-infesting mites belong to the families Acaridae, Glycyphagidae, and Carpoglyphidae. Several species can be found infesting dried foods such as bread, dog foods, cereals, smoked meats, etc.

Because of their explosive reproduction, a store, kitchen, or warehouse can be crawling with these mites before their presence is noted. They can destroy cheeses leaving nothing but a mass of living mites and excreta. A species was reported to destroy an entire haystack in Ireland a number of years ago. Some will even live in wine barrels, apparently taking nourishment from the wine.

Not only do they infest and destroy foods, but they can cause a dermatitis in handlers of wheat, copra, cereals, etc., and at times workers have refused to handle infested materials. These mites also have been found to cause certain lung disorders where they are plentiful enough to be inhaled. Records which appear to be authentic have shown they infest the urinary tract in man causing infections and irritations. Ingestion of food infested with these mites leads to digestive disturbances which cease when the food is removed, thus eliminating the mites from the diet.

Control is a matter of cleanliness, fumigation, and residual sprays. No control appears to be perfect. Chloropicrin was found to be the most effective fumigant; an aqueous solution of the sodium salt of o-phenylphenol as a spray or dip was effective for controlling the mites on cheeses; the acaricides mentioned previously may prove to be beneficial in homes and buildings where contamination of foods is not a factor.

(**Editor's Note**: Dr. Baker has written a book in conjunction with A. Earl Pritchard entitled "**A Revision of the Spider Mite Family Tetranychidae.**" It is available for $10 from the Pacific Coast Entomological Society, Academy of Sciences, San Francisco, Calif.)

* For suggested control measures see Pest Control, Sept. '54, pg. 23; March '55, pgs. 25, 26; NPCA Technical Release 4-5, Feb. 4, '55.

PESTMASTER*
Methyl Bromide Fumigant

- economical
- effective
- easy to use

PESTMASTER* MEANS DEATH for insects at every stage of life: eggs, larvae and adult. Deeply penetrating, odorless, non-corrosive and non-flammable, it can be used in all types of sealable buildings, storage bins, boxcars, warehouses, elevators and ships — penetrating into bags and packages therein.

Available in one-pound cans as well as in 10, 40, 50, 100, 150, and 400 pound cylinders, PESTMASTER* Methyl Bromide is easily applied directly from the original container. Aeration after fumigation removes all traces of the gas. It is effective in house fumigation, ridding the premises of drywood termites, vermin, rodents and common insects.

Fumigation manual with complete details on the many uses of PESTMASTER Methyl Bromide Fumigant is yours on request. Use the coupon below.*

MICHIGAN CHEMICAL CORP.
506 Bankson St., Saint Louis, Mich.
Please send FREE PESTMASTER FUMIGATION MANUAL.*

Name_____

Firm_____

City_____ State_____ Country_____

MB 55-3

MC **

*Reg. U.S. Pat. Off.
**Trademark

MICHIGAN CHEMICAL CORPORATION Saint Louis, Michigan

EASTERN SALES OFFICE: 230 Park Avenue, New York 17, New York

QUALITY PRODUCER OF PESTMASTER* DDT AND METHYL BROMIDE AND OTHER AGRICULTURAL CHEMICALS

How Anticoagulant Rodenticides Were Developed

by
ERNEST M. MILLS
District Agent, Fish & Wildlife Service
New Brunswick, New Jersey

WARFARIN **COUMACHLOR** **PIVAL** **FUMARIN**

EVENTS leading up to the development of synthetic anticoagulant-type rodenticides constitute a fascinating story in the annals of medical research. Among these chemicals are warfarin, coumachlor, Pival, and Ratafin. These revolutionary rodent killers would not exist today were it not for the curiosity of investigators outside the pest control field.

Some of the early studies were undertaken to discover the cause of "Sweet Clover Disease" in cattle. As will be detailed later, it was found that the cause of this disease was an anticoagulant. The objective of succeeding work was to improve this anticoagulant so that it would prove useful in preventing post-operative blood clots in humans. Anticoagulant rodenticides are by-products of such medical research.

All of the work done on the dicoumarins until 1948 was from a medical point of view although it was realized that they had some effect on rodents. In that year, O'Connor published his work that one of the dicoumarins had practical use as a rodenticide.

After one of the basic dicoumarins had been isolated and synthesized, many analogs or derivatives were found. Following several years of additional research, a few of them qualified as practical anticoagulant rodenticides, the first being warfarin. About the same time, one of the indandione insecticides was found to have properties similar to dicoumarin derivatives and was developed as a rodenticide, named Pival.

This article describes briefly the chronological development of the various synthetic anticoagulants. Techical details are omitted except as they bear upon development. Although some particulars still remain obscure, most of the discussion is documented, based upon published statements or official correspondence of the Fish and Wildlife Service. A selected list of references will enable the reader to study these developments more in detail.

• Dicoumarin

The word "dicoumarin" is a class name to describe a group of substances. Various authors have used this term rather loosely, employing such designations as dicoumarin, dicoumarol, and Dicumarol. More correctly, they refer to **a** dicoumarin and usually the generic chemical with the formula of 3,3'-methylenebis (4-hydroxycoumarin). For simplicity, the writer will continue to use "dicoumarin" as it has been so widely used in the literature.

The term "Dicumarol" is the property of the Wisconsin Alumni Research Foundation. A claim for a trade-mark for this chemical was filed on June 6, 1942 (Ser. 453,526) and published July 28, 1942 (Class 6). The trademark of "Dicumarol" was granted on Oct. 13, 1942 (No. 398,198). The Foundation claimed use since May 15, 1942.

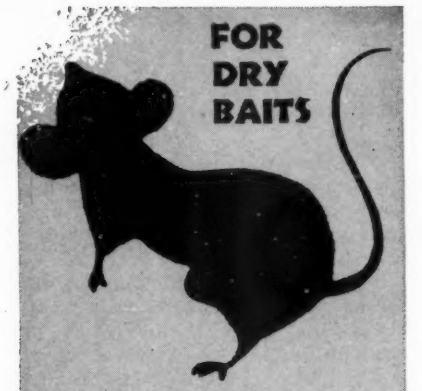
Investigations of this compound began about the year 1903 when the German investigator Richard Anschutz[1] described a synthetic chemical as one of the dicoumarins. At the time, he was unaware of its physiological action, and no particular significance was attached to the discovery.

Thirteen years later, in 1922, Schofield[2], a Canadian veterinarian, reported on his observations of a strange hemorrhagic disease in cattle which developed when the animals were fed spoiled sweet clover hay. In the same year, similar observations were made by Roderick[3] in North Dakota, and by 1929 he found that the disease was due to a deficiency of prothrombin that prevented blood from clotting. Roderick and Schalk[4] were unable to find the cause of the disease and abandoned the project short of completion. These men almost found the answer for they stated, "It is not likely that the coumarin is the cause of injury from damaged sweet clover unless it results from a decomposition product." Further study was then sponsored by the U. S. Department of Agriculture in cooperation with the Wisconsin State Experiment Station.

Link and his associates[5] began work along this line in 1934 when Experiment Station geneticists asked him to develop a method for estimating the coumarin content of sweet clover. Coumarin, $C_9H_6O_2$, is the odorous principle of the **Melilotus** family which gives the newly mown hay its characteristic odor. This interest in clover was also associated with another event that took place at about the same time.

A dairy farmer of Deer Park, Wisconsin brought a cow that had died of the hemorrhagic disease to the laboratories of the State Experiment Station. He wished to know the cause of death and a method of prevention. Dr. Link of this Station worked for five years to find a material to make blood clot and to find the unknown chemical in spoiled hay. On June 28, 1939 Campbell[6], one of Link's assistants, isolated a few tiny crystals in spoiled hay until they had a spoonful of the anticoagulant. It is thought that the natural dicoumarin is produced by the oxidation of coumarin in spoiled hay followed by coupling with formaldehyde[6].

During this period other scientists made parallel observations. In 1934 Brink and Roberts [7] found that the coumarin content of some sweet clovers **(Melilotus dentata)** was extremely low. In 1937 Quick[8]



anti-coagulant rat and mouse killer

PIVAL®

More than just another rodenticide, Pival combines its effective killing power with three other and exclusive characteristics.

Tops in acceptability—on free feeding tests against a leading anti-coagulant rodenticide, Pival cereal baits have shown substantially greater acceptability — an important plus in achieving effective control.

Resistance to insect infestation — extensive laboratory tests of Pival's insecticidal action have demonstrated that, even under conditions of severe exposure, specially prepared Pival cereal baits are far less subject to insect infestation — an important plus in bait storage and in use.

Resistance to mold contamination— during large scale field application in both Louisiana and the Philippines, permanent bait stations exposed during the heat and humidity of full Summer remained completely free of mold. Laboratory tests prove the delaying action of Pival to mold contamination in cereal baits — another important plus to permanent baiting programs.

It is easy to see why large scale field usage has shown an unusually high degree of successful application of Pival cereal baits in the control of Norway rats, roof rats and house mice. Reorder now for the coming season.

CHEMICAL SPECIALITIES MOTOMCO, INC.

MOTOMCO, INC.
10 MURRAY ST., NEW YORK 7, N. Y.

observed that the sweet clover disease could be prevented by adding 5% dehydrated alfalfa meal to toxic hay. This observation led to the later discovery that Vitamin K was an anti-hemorrhagic agent.

In 1938, Smith and Brink[9] showed that the toxic principle in spoiled hay could be produced by adding coumarin to hay with the proper moisture content, but they did not know the nature of this toxic substance. In the meantime, Roberts and Link[10] had worked out a colorimetric method for the determination of coumarin in plant tissue.

Following the isolation of the toxic or anticoagulant principle in spoiled sweet clover, Stahmann, Huebner, and Link[11] produced the synthetic anticoagulant, 3, 3'-methylenebis (4-hydroxycoumarin). This substance appeared to be identical with the one produced by Anschutz except that the melting point was about 30° higher.

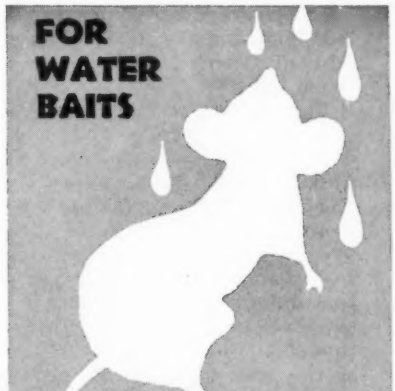
The Wisconsin Alumni Research Foundation applied for a patent for making this synthetic dicoumarin on October 11, 1941 (No. 414,688). A "use" patent was granted on June 17, 1952 (U.S. 2,601,204). The title was "Process of lowering blood prothrombin level and lengthening clotting time with methylenebis-hydroxycoumarin."[12]

• Compound 42

Dicumarol was slow in action so further research was undertaken to find a derivative to give quicker response as an anticoagulant. Over 300 derivatives have been prepared.

Most of the compounds were tested on rabbits on a single dose basis but none proved to be as effective as the parent material. However, some tests were made on white rats and mice and it was noted that Compound number 42 in the test series was more effective in causing hemorrhages. When Link saw these reports, he made a note to the effect "might make a good exterminating agent."[13] Krieger[14] also states that "this observation prompted Professor Link to make the notation that this compound might be a good rat poison."

Compound 42 was synthesized by Ikawa, Stahmann, and Link[15] in 1942 with the chemical formula of 3-(alpha-phenyl-beta-acetyl-ethyl)-4-hydroxycoumarin, now identified by the name 3 (acetonyl



anti-coagulant rat and mouse killer

PIVALYN®

Pivalyn is the only water soluble anti-coagulant which combines top acceptability, resistance to molding and equal effectiveness in hard and soft water. Used alone in place of the older cereal-type baits, this superior water-soluble anti-coagulant has proven its effectiveness in areas from coast to coast and under widely varying conditions on farms, in homes and in business establishments.

Simple to use, it is packaged for the PCO as a 4.4% concentrate in convenient individual foil packets. One Pivalyn packet to one quart of water—that's all there is to it! As a "taste-treat" for rodents, and under conditions of difficult control, sugar may be added to the Pivalyn solutions.

Pivalyn's exclusive mold-resistant action provides excellent keeping qualities. Even with the sugar added (and laboratory tests have indicated as high as 10 to 1 acceptability over plain water by the addition of two tbsp. of sugar per quart), Pivalyn water baits normally remain mold-free for periods up to eleven weeks.

A worthy companion to Pival — the new and improved rodenticide for use in dry baits — which has proven itself by your reorders, Pivalyn is ready to go to work for you. Packaged for the PCO in units of 100 packets per box.

CHEMICAL SPECIALITIES MOTOMCO, INC.

MOTOMCO, INC.
10 MURRAY ST., NEW YORK 7, N. Y.

benzyl) -4-hydroxycoumarin. It was patented by the Wisconsin Alumni Research Foundation on Sept. 16, 1947 (U.S. 2,427,578).

Research by the Wisconsin group was interrupted by war work and then by illness of Dr. Link. In 1947, Lester Scheel and Dorothy Wu, two of Link's students, began a re-study of the 4-hydroxycoumarins. "This time they assayed the compounds on rats and mice and discovered their superior killing power on these rodents. Compound 42 emerged as the best of the lot."[13] It was then estimated that Compound 42 was about 50 times more toxic to white rats than Dicumarol.

• Multiple Dose Technique

At this point in our story, we must switch to Great Britain. Their investigators in rodent control had been studying the various rodenticides for many years. O'Connor found that the rodenticides in common use (Zinc phosphide, red squill, arsenious oxide, and Antu) would produce "bait shyness" when eaten in sublethal doses.

Barnett[16] has described the methods used to eradicate rats on the Isle of Malta where 75 cases of plague were diagnosed in 1945. He states, "When the control measures started, nearly all the bait was taken; six to 17 months after the treatment only 11.6% of 362 test baits had been touched three days after setting."

As a result, work was started by O'Connor to develop a poison that would not produce bait shyness. In April 1948, O'Connor[17] published his report that dicoumarin had proven successful by the multiple dose technique with both laboratory and field rats. He established a new principle of rodent control by introducing very low concentrations of a non-detected poison requiring several feedings to produce lethal effects. He noted that dicoumarin would kill laboratory rats in two weeks when given small daily doses and also found it effective in field tests.

• Warfarin

The work of O'Connor made a profound impression on researchers and others working on rodenticides. One enthusiastic chemical manufacturer of London (Ward, Blenkinsop & Co., Ltd.) sent an invitation on August 13, 1948 to the Fish and Wildlife Service for a representative to witness their tests wih dicoumarin. In lieu of this visit, the manufacturer sent a sample of technical dicoumarin, with instructions for multiple dose testing, to the Wildlife Research Laboratory of the Fish and Wildlife Service at Denver, Colorado under date of September 13, 1948.

Krieger[14] said, "In April 1948, reports appeared in the English literature that Dicumarol had all the earmarks of being an efficient rodenticide. Since the Wisconsin group had data indicating that Compound 42 was a more potent anticoagulant in the rat than Dicumarol, added impetus was given to this research project."

An article in Reader's Digest on Dicumarol by Miller[18] created further interest in this project.

The next official development in the United States was a conference at Madison, Wisconsin on December 1 and 2, 1948 to discuss a research program with the new rodenticides. Dr. Link invited Mr. Crabtree of the Wildlife Research Laboratory, Mr. R. J. Prentiss, and others to this conference. The chemical proposed at this conference for further study and commercial development was a mixture of Compound 42 and Pival, administered in a single dose. As a result of tests with this combination, it was found that effective results could not be obtained. At this point, the R. J. Prentiss & Co. withdrew from the program. (Letter from Wisconsin Alumni Research Foundation, dated Feb. 7, 1949).

However, despite the difficulties encountered, the Wildlife Research Laboratory urged continuance of the tests and the solicitation of other commercial firms who might be interested. A summary of the tests by the Wildlife Research Laboratory and the Wisconsin Alumni Research Foundation indicated that Compound 42 alone or in combination with Pival was superior to Dicumarol as a rodenticide. The Pival referred to in this section was made in Dr. Link's laboratory in 1944. Gram for gram, Compound 42 was then cheaper to manufacture than Pival.

It required about another year of extensive laboratory studies and limited field tests by governmental agencies and others to demonstrate the possible merits and practical use of Compound 42. Crabtree[19] published a preliminary report on laboratory and field investigations in February 1950. Schein[20] published a similar report in March 1950. An experimental permit was granted by the U. S. Department of Agriculture to allow extensive field tests with Compound 42. The principal groups participating in these tests were the U. S. Fish and Wildlife Service, the U. S. Public Health Service, the National Pest Control Association, and the Wisconsin Alumni Research Foundation.

This cooperative work with

"You drive a hard bargain J. B. I should have half my pay in cash you know."

3 JOBS MADE EASY BY CYANAMID PRODUCTS

1

FLY CONTROL. MALATHION is the efficient, low-cost way to kill flies, including those which have developed resistance to DDT and other chlorinated hydrocarbons. Quick-acting! *Up to three weeks residual,* depending on original infestation, general sanitation and weather. Malathion insecticides are formulated by well-known manufacturers under their own brand names. Easy to use as a spray made from wettable powder or emulsifiable liquid. Also available as a dry bait.

2

RAT CONTROL. CYANOGAS® A-Dust is the ideal fumigant for effective, economical control of rats in burrows, city dumps, sanitary fills; under sidewalks, tight floors, pavements; along ditch banks and levees. Not a bait—CYANOGAS A-Dust liberates hydrocyanic acid gas in the burrow. Rats, adult and young, that breathe the gas die quickly. A-Dust is ready for instant use, requires no further preparation. Best applied with handy CYANOGAS FOOT PUMP. Method of application leaves no dangerous residues to be picked up by children or pets.

3

FUMIGATION. AERO* HCN DISCOIDS, Fumigant, is the most generally used fumigant in the Pest Control industry. Simplifies job of fumigating dwellings, industrial buildings, railroad cars, ships, stored commodities. DISCOIDS are thin cellulosic discs saturated with commercially pure hydrocyanic acid, and are simply scattered from the can. No dirt or mess in application or clean-up. Especially suitable where insects and rodents are a problem in enclosed spaces.

Consult your regular source of supply, or write us for further information.

Branch Offices: Donaghey Building, Little Rock, Arkansas.
1440 Broadway, Oakland 12, California.
3505 N. Kimball Ave., Chicago 18, Illinois.
5025 Pattison Ave., St. Louis 10, Missouri.
Burwell Building, Knoxville, Tennessee.
16 West Martin St., Raleigh, N. C.
Brewster, Florida.

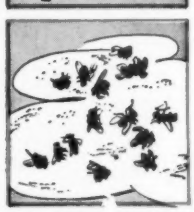
*Trade-mark

AMERICAN Cyanamid COMPANY
AGRICULTURAL CHEMICALS DIVISION
30 Rockefeller Plaza, New York 20, N. Y.

FLY FLAKES

kills 'em fast ...and easy!

merely 1 scatter by hand



watch 'em 2 die

sweep 'em 3 up

The new, improved FLY FLAKES

- *Kill flies in minutes*
- *Kill resistant strains*
- *Kill maggots*
- *Are economical-to-use*
- *For dairy barns, feed rooms, poultry houses, manure piles, outside areas.*

FLY FLAKES, outstanding last year, are even more potent this year. The new, improved FLY FLAKES are the simplest, most effective and yet the most economical control devised.

Available in 1 lb. cans; 2, 5 and 10 lb. bags, and 25 lb. drums

MATHIESON

OLIN MATHIESON CHEMICAL CORPORATION

Insecticides Division

ONE PARK AVE., N.Y. N.Y. • BALTIMORE 3, MD. • LITTLE ROCK, ARK.

Compound 42 showed that the field tests confirmed the laboratory data. Meantime, numerous tests on acceptability, toxicity, bait formulations, and many other problems were carried out both in the laboratory and field. It was demonstrated that the LD-50 to wild Norway rats was 5 mg./Kg. with five daily one mg. doses, but the toxicity varied with black rats, house mice, and other animals.

It was found that cats, dogs, and chickens usually required rather high single or cumulative doses to cause death. Acceptability in cumulative doses was found to be adequate to obtain efficient kills. Dry bait formulations and methods of exposure in the field were then developed. It was also determined that Vitamin K was a useful antidote.

The sequence of names of substances resulting in the final marketed product has been coumarin, dicoumarin, Dicumarol, Compound 42, and finally warfarin. At the time warfarin was named, it was the function of the Interdepartmental Committee on Pest Control (a group representing all Federal government departments concerned) to approve coined generic names of pesticides. At present, the American Standards Association announces approved names that have been proposed by interested companies.

Under date of June 29, 1950, the common name "warfarin" was selected to designate Compound 42 by the Interdepartmental Committee. The first four letters of warfarin stand for the initials of the Wisconsin Alumni Research Foundation. The U. S. Department of Agriculture gave registration for public sale of warfarin on June 29, 1950.

The initial type of warfarin was a colorless, crystalline solid, insoluble in water. As soluble type rodenticides are sometimes desirable, work was started to produce both acid and sodium salts of warfarin. A limited registration for use by the cereal and grain industry was given by the U. S. Department of Agriculture on May 28, 1952 and general registration was granted early in 1954.

The public acceptance of this new rodenticide has been phenomenal. It should be kept in mind that only 7 or 8 rodenticides have been developed over several centuries. Some of these chemicals were not very efficient, others were highly toxic, or dangerous to other animals. Thus, it was news that an efficient and relatively safe rodent poison had been developed.

The first publication on the use of warfarin by the public was issued on August 7, 1950 by the U. S. Fish and Wildlife Service under the title of "Use of warfarin for the control of rats and mice." This was followed by many articles in popular and trade magazines. One that had wide-scale publicity for warfarin appeared in the Reader's Digest for March 1951.[21] About a hundred other articles were published on the merits and use of warfarin during 1951 and 1952.

Warfarin was first sold as concentrate or a 0.5% powder to be mixed with a suitable cereal or grain bait. Gradually, many firms formulated a ready-to-use or finished bait. It has been estimated that during the first fifteen months (July 1, 1950 to September 30, 1951) about 1,000,000 pounds of the concentrate in powder and finished form were sold under about 300 different trade names.[22] A recent patent (U. S. 2,687,365 August 24, 1954) was granted to Dr. Link for a formulated bait using the sodium salt of warfarin with cracked corn plus mineral oil and corn-sirup as coatings.

• Coumachlor

Drs. Stoll and Litvan of the research laboratories of J. R. Geigy S. A., Basle, Switzerland developed another anticoagulant rodent poison under the coined name of coumachlor. This company conducted small scale attempts to synthesize various compounds for

Rodent-Free Bird Feeder Is Cheap, Easy to Build

If you have a customer who has rat troubles because he sprinkles bird feed all over the lawn, or has a low ground-supported feeding box for his favorite robins, here's a tip for an easy to construct, inexpensive, and rat-proof bird feeding station.

Cleveland Deputy Commissioner of Health, E. B. Buchanan, and Fish and Wildlife Service personnel brought this "do-it-yourself" bird feeder to the attention of **Pest Control.** It's a cheap and efficient means of eliminating one important rodent food source.

Rats can be held to a minimum with this home constructed feeding station. The smooth surface and overhang of the upper bowl make hazardous going even for squirrels who might be attracted to this feeder. It will hold about two pounds of feed at a time. Feeding station can be decorative addition to yard since bowls come in red, yellow, and green shades.

Dismantled bird feeder shows simplicity of construction. Two plastic salad bowls, screws, wire, and section of broomstick are all that is needed. Large salad bowl is used for top of feeder. Container at right serves as base. At left is piece of broom handle used to hold feeder together. Bottom bowl is fastened to broom handle with 3/4" brass screw. Top is held in place with a brass cup hook. Small bowl has a 1/8" hole drilled in each corner for drainage. Assembly can be suspended from tree branch by a length of wire. All the materials for the feeding station cost less than $1.25. Large bowl costs 69c in most five and tens. Small container sells for 39c. And screws and wire can be purchased for 10c.

several years prior to 1948. The paper by O'Connor[17] in 1948 "stimulated us to continue our efforts in fighting against rodents and to enlarge the biological and chemical work in synthesizing and testing anticoagulants."[23]

In 1949 Stoll and Litvan found a series of coumarol derivatives with promising rodenticidal properties. Among these preparations, the best appeared to be 3- (alpha-acetonyl- 4-chlorobenzyl)- 4-hydroxycoumarin. European patents were obtained on this preparation, French Patent 1,028,474, and Swiss Prior. 31.1.1950. The compound is also covered by U. S. Patent 2,648,682, August 11, 1953.

This preparation has been distributing as a 1% tracking powder in Switzerland and several European countries since 1950 under the trade name of "Tomorin." Reiff and Wiesmann[24] described the characteristics of the rodenticide in 1951. Samples were brought to the United States in 1951 and work was carried out by the Fish and Wildlife Service to assay its value as a bait ingredient rather than a tracking powder.

The coined or common name coumachlor was accepted on May 27, 1953 by the Interdepartmental Committee on Pest Control for the active ingredient in "Tomorin" rodenticides. Up to the present time it has not been marketed in the United States.

Coumachlor is a white, crystalline powder, practically insoluble in water. A sodium salt of coumachlor has been developed that is soluble in water. In order to prepare a satisfactory water solution for the control of rats and mice, the Geigy Company has formulated a combination of various substances.[25] One preparation contains the sodium salt of coumachlor, a synthetic olfacto-gustative substance, a violet-colored dye, and a preservative to prevent mildew.

• Pival

This chemical is an indandione derivative with the formula, 2 pivalyl-1, 3-indandione. During the testing period it carried the experimental compound number of 333. It is not related chemically to the 4-hydroxycoumarin group such as warfarin and coumachlor. It was first prepared and tested as an insecticide. Later, it was found to possess anticoagulant properties with rodenticidal possibilities.

Pival was first prepared in 1942 by Kilgore and associates[26] in their studies on fly sprays. They state that "since it is prepared from the expensive pinacolone, its commercial production is not so feasible as the slightly less active isovaleryl compound now being used." It was patented the following year, U. S. Patent 2,310,-949 and reissued on August 8, 1947, U.S. Reissue Patent 23,080.

Don't Worry

when your October issue of **Pest Control** doesn't arrive on time. We're not going to press until the last minute in order to bring you all the latest news on the NPCA Denver Convention. We're sure you will consider the delay worthwhile when you see the multitude of illustrations, features, columns in next month's issue to be mailed **October 15.** Besides NPCA news this number includes these six articles:

- **Control Depends On Habits**
- **Recognition of Insect Damage**
- **New Household Insects**
- **Fabulous Carpenter Ant**
- **Wood Destroying Fungi**
- **Cooperation Between PCO and Food Sanitarian**

The next work done with Pival was reported by Knipling and associates[27] in 1948 although the actual testing was carried out in 1943. These investigators were interested in the chemotherapeutic value of certain insecticides against external bloodsucking parasites, lice and mosquitoes.

Pival was fed to rabbits and found to be quite successful in killing body lice. These investigators noticed that high doses of Pival might kill the rabbits and that there was a definite accumulation of the toxic agent in the blood of the host when the chemical was administered orally each day for several days. Due to the advent of DDT about this time, further work with Pival was discontinued as it did not show comparable possibilities for insect control.

In 1944, Kabat and associates [28] described the hypoprothrombic action when ingested by mammals in food baits, even as low as 1 mg. per kilogram. In this report, they state that "one of these compounds, 2 pivalyl-1, 3-indandione is as effective a hemorrhagic agent as dicumarol." Thus, these men discovered the anticoagulant action of Pival but did not conceive the multiple dose method of causing death.

The Wildlife Research Laboratory of the Fish and Wildlife Service received its first sample from the Kilgore Development Co. on April 22, 1944. During routine work in evaluating toxic chemicals as possible rodenticides, the single dose method of testing materials was then employed. Pival did not cause any symptoms when using this technique.

During the early studies with warfarin, a previous section mentioned the combination of Pival with warfarin in the hope that Pival would decrease the killing time of warfarin. As the tests showed that Pival would not decrease killing time and because of the then high cost of manufacture, further work with Pival was discontinued.

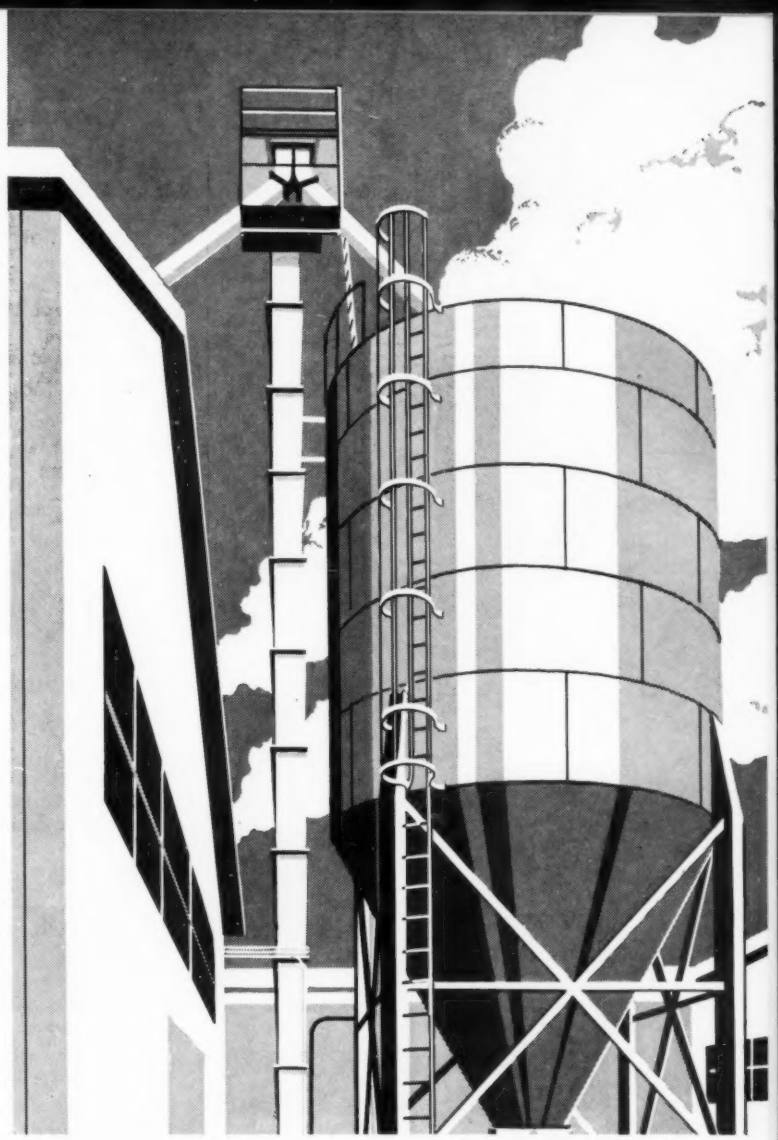
The next step came in 1952, when the Kilgore Development Co. assigned their patent to Motomco, Inc. The latter arranged for the Ringwood Chemical Corporation to undertake commercial production of Pival.

By this time, the multiple dose technique of using anticoagulants had been established. The Wildlife Research Laboratory then started additional laboratory work, and, in cooperation with other groups, some 145 field tests confirmed the practical value of this chemical as a rodenticide.[29] It was also established by Hazleton Laboratories that the antidote for Pival is similar to other anticoagulants, that is, Vitamin K but preferably Vitamin K_1.

Further tests with Pival during the last two or three years have yielded data indicating that it tends to retard development of certain insects and mold in cereal-type baits, a problem in packaged material or baits exposed under warm and humid conditions. [30]

An experimental permit was issued by the U. S. Department of Agriculture on August 14, 1952, and registration for public sale was granted on March 26, 1953.

Work was started in 1952 to develop a soluble form of Pival that could be exposed in liquid baits. Field tests have been completed, and water soluble formu-



CHAPMAN

SEPTEMBER IS THE TIME FOR . . .

STABLCHLOR emulsifiable Chlordane for termite and general pest control. 55, 30 or 5-gallon drums and four 1-gallon bottles.

CHLORDANE-8 emulsifiable Chlordane for termite and general pest control. 55, 30 or 5-gallon drums and four 1-gallon bottles.

CHAPMAN ROACH AND PEST KILLER 20% Chlordane Concentrate for oil dilution. General pest control. 55, 30 or 5-gallon drums.

BHC-1 Emulsifiable Gamma Isomer or Benzene Hexachloride for termite and other pest control. 55, 30 or 5-gallon drums.

ALSO: DDT-2 . . . Lindane 20% Emulsifiable . . . Malathion-5 . . . Pivalyn . . . Pivalyn Concentrate . . . Pivalyn Concentrate Packets . . . Penta Preservative Concentrate (1-10) . . . Permatox A Concentrate (1-10).

Chapman ...CHEMICALS FOR PROGRESSIVE PCO'S

In the science of pest control, Chapman Chemicals stand out. Chapman technicians are constantly working to keep chemicals bearing the Chapman label the best available . . . chemicals the professional pest control operator can depend on to obtain the consistent results which build and maintain a good name for his business.

If you do not have your copy of Chapman's "BUYER'S GUIDE AND HANDBOOK" of technical information, and Chapman's "PCO PROMOTION PLAN" to get new business, write today to Chapman Chemical Company, Dermon Building, Memphis, Tennessee.

good riddance...

with the *

RAT JIGGER

RODENTICIDE CONTAINER

WON'T TIP . . . even if rat steps on edge! Flared skirt fits flush to floor.

WON'T LEAK . . . tests show not a sign of seepage after 18 days! Specifications require 3 days.

STURDY AND SEAMLESS . . . one piece construction shaped under tons of pressure. Holds 3/5 fluid ounce.

BUILT-IN SAFETY . . . warning symbols of skull and cross bones, and "poison" printed all over it.

TESTED AND APPROVED . . . Rat Jiggers meet all specifications of Federal Agencies and National Pest Control Association.

Rat Jiggers set the standard for quality and safety as incorporated in Standard Safe Handling Procedure for Compound 1080 and other liquid poisons. Packed 5000 to a case.
Prices per M, 5M - 25M . . . $5.62 M
Minimum order 4 cases shipped prepaid. Larger quantity prices on request.

UNIVERSAL PAPER PRODUCTS CO.
380 Lexington Ave., New York 17, N. Y.

* T.M. PAT. PEND.

Universal Paper Products Company
380 Lexington Ave., New York 17, N. Y.

☐ Send samples and full information.

☐ Ship through nearest distributor, 1 case of 5000 No. 1080 RAT JIGGER* Rodenticide Containers @ $5.62 M. Total $28.10, plus freight.

☐ C.O.D. ☐ Check enclosed

Print Name .....

Street .....

City..... Zone.... State.....

lations were registered in January 11, 1954 for public use.

The trademarked name of Pival is being used pending the proposal and approval of an acceptable coined name for the chemical. The trade name of the insoluble powder is Pival, while the water-soluble type is known as Pivalyn.

• Fumarin

Another compound of the 4-hydroxycoumarin group is known as "fumarin." The formula is 3(1′ furyl 2′ acetyl) ethyl 4-hydroxycoumarin. The chemical was first made in Germany. The Wildlife Research Laboratory reports that the results of 59 field exposures of "fumarin" made for the control of Norway rats,, roof rats and house mice indicate this material is promising as a rodenticide.

Editor's Note: Fumarin has recently been approved for use by the Department of Agriculture. It will be distributed as a 0.5% formulation under the trade name Ratafin-22, by the American Chemical Paint Co., Ambler, Pa. (See PC, Aug. '55, p. 50).

• Acknowledgments

This material has been reviewed by D. Glen Crabtree and W. W. Dykstra of the U. S. Fish and Wildlife Service, and Justus C. Ward of the Agricultural Research Service, U. S. Department of Agriculture. Information on the development of the various products has been supplied by officials of the Wisconsin Alumni Research Foundation, Geigy Company, Motomco, Inc., and the American Chemical Paint Company. Their assistance is hereby gratefully acknowledged.

LITERATURE CITED

1. **Anschutz, R.** Ueber eine neue Klasse aromatischer, der Tetronsaure verwandter Verbindungen. Berichte der Deutschen Chemischen Gesellschaft 36 a:465, 1903.
2. **Schofield, Frank W.** A brief account of a disease in cattle simulating hemorrhagic septicemia due to feeding sweet clover. Canadian Vet. Record 3:74-8, 1922.
3. **Roderick, Lee M.** The pathology of sweet clover disease in cattle. J. Amer. Vet. Med. Assoc. 74:314-326, 1929.
4. **Roderick, L. M. and Schalk, A. F.** Studies on sweet clover disease. N. Dakota Agri. Exp. Sta. Bul. Tech. 250, 1931.
5. **Cannon, Grant.** Warfarin. The Farm 7 (4): 34 on, winter 1952.
6. **Link, Karl Paul.** The anticoagulant from spoiled sweet clover hay. The Harvey Lectures Series 39: 162-216, 1944.
7. **Brink, R. A. and Roberts, W. L.** The coumarin content of **Melilotus dentata.** Science 86:41-42, 1934.
8. **Quick, Armand J.** The coagulation defect in sweet clover disease and in the hemorrhagic chick disease of dietary origin. Amer. J. Physiol. 118:260-271, 1937.
9. **Smith, Wm. K. and Brink, R. A.** Relation of bitterness to the toxic principle in sweet clover. J. Agri. Research 57: 145-154, 1938.
10. **Roberts, W. M. and Link, K. P.** A precise method for the determination of coumarin, melilotic acid, and coumaric acid in plant tissue. J. Biol. Chem. 119: 269, 1937.
11. **Stahmann, N. A.; Huebner, C. F. and Link, K. P.** Hemorrhagic sweet clover disease. V. Identification and synthesis of the hemorrhagic agent. J. Biol. Chem. 138:513-527, 1941.
12. **Bingham, J. B.; Meyer, O. O.; and Pohle, F. J.** Studies on the hemorrhagic agent 3, 3′-methylenebis (4-hydroxycoumarin). I. Its effect on the the prothrombin and coagulation time of the blood of dogs and human beings. Amer. J. Med. Sci. 202:563-578, 1941.
13. N. N. Rough on rodents. Chemical Industries 65 (1):31-32, July, 1949.
14. **Krieger, Carl H.** Compound 42, a new anticoagulant as a rodenticide. Pest Control 17(5):24 on, May, 1949.
15. **Ikawa, Miyoshi; Stahmann, M. A.; and Link, K. P.** Studies on 4-hydroxycoumarins. V. The condensation of a, B-unsaturated ketones with 4-hydroxycoumarin. J. Amer. Chem. Soc. 66:902-906, 1944.
16. **Barnett, S. A.** Rat control in a plague outbreak in Malta. J. Hygiene (Cambridge) 46:10-18, 1948.
17. **O'Connor, J. A.** Use of blood anticoagulants for rodent control. Research (London) 1:334-336, 1948.
18. **Miller, L. M.** Dicumarol, miracle in the haystack. Reader's Digest 53:22-24, Oct. 1948.
19. **Crabtree, D. Glen.** Raticidal potentialities of WARF-42. Soap and San. Chem. 26(2):131 on, 1950.
20. **Schein, Martin W.** Field test of the efficiency of the rodenticide compound W.A.R.F.-42. Pub. Heal. Rpts. 65(11): 368-372, 1950.
21. **Kruif, P. de.** Sure death to rats. Reader's Digest 58 (347):92-94, 1951.
22. **Dykstra, W. W.** Warfarin. Paper—Assn. Economic Poisons Control Officials. Washington, D. C., Oct. 6, 1951.
23. **Stoll, Arthur.** History of the development of coumachlor rodenticide. Letter from J. R. Geigy Soc. An., Basle, Switzerland. May 5, 1953.
24. **Reiff, Von M. and Wiesmann, R.** Untersuchungen uber ein neues rodentizid mit kumulativer wirkung aug basis der cumarin-derivate. Acta Tropica 8 (2): 97-130, 1951.
25. **Geigy, J. R. A. G.,** Basle. Poison baits for rodent control based on the sodium salt of coumachlor. Information (circular) 4 pp., Dec. 18, 1953.
26. **Kilgore, L. B.; Ford, J. H.; and Wolfe, W. C.** Insecticidal properties of 1,3-indandiones. Effect of acyl groups. Industrial Eng. Chem. 34: 494-497, 1942.
27. **Knipling, E. F.; Bushland, R. C.; Babers, F. H.; Culpepper, G. H. and Raun, E. S.** Evaluation of selected insecticides and drugs as chemotherapeutic agents against bloodsucking parasites. J. Parasitology 34 (1):55-70, Feb. 1948.
28. **Kabat, Herman; Stohlman, E. F. and Smith, M. I.** Hypoprothrombinemia induced by administration of indandione derivatives. J. Pharm. and Expt. Therap. 80:160-170, 1944.
29. **Crabtree, D. Glen.** Analysis of reports on the performance of "Pival." Special Report, U. S. Fish and Wildlife Service, Feb. 6, 1953.
30. **Crabtree, D. Glen and Robinson, Weldon B.** Pivalyl, the new insecticidal rodenticide. Pest Control 21 (7):22 on, 1953.
31. **Steiniger, F.** On the action of Fumarin, a new anticoagulant for rat control and its toxicity to domestic animals. Nachr. Bl. dtsch. Pfl. Sch. Dienst. Braunschweig. 5: 167-8, 1953.

OK Perthane For Aerosols

Perthane, an insecticide concentrate made by Rohm & Hass Co., Philadelphia, Pa., may now be used in household space aerosols. Applications for registration of aerosol insecticides formulated for home use with Perthane are currently being accepted by the government.

Introduced in 1954, Perthane is said to have a high solubility when mixed with kerosene thus eliminating the need for aromatics and methylene chloride. Other reported product advantages are low toxicity, moderate cost, and little odor.

We offer...

Pival Bait

(RODENTICIDE)

Ready to use or sell in 50# drums with your label or ours. Write for details and prices.

And

• • •

Motomco Pival CONCENTRATE

1,000 LBS., SINGLE SHIPMENT	$1.45 LB.
100 LB. DRUMS	1.55 LB.
25 LB. DRUMS	1.65 LB.

Prices are FOB Minneapolis, Minnesota or Ringwood, Illinois and are subject to our acceptance of orders and availability of merchandise on requested delivery date.

Quantities of 50 pounds or more of PIVAL CONCENTRATE shipped prepaid by McLaughlin Gormley King Company. Order today. Terms: 1% 10 days net 30 days.

McLAUGHLIN GORMLEY KING COMPANY

1714 S.E. Fifth Street, Minneapolis, Minnesota

NEW, IMPROVED!

Cut cost! Save time!

3 GALLON STAINLESS STEEL SPRAYER

A 3 gallon stainless steel unit that is built for service! Economical and efficient in operation. CHECK THESE FEATURES: All mechanical seals — no soldered inlets — leakproof valve gauge with unbreakable crystal — stainless steel 3 gal. tank and pump by Hudson. Renewable hose end adapters — 5 ft. PCE oil-resistant hose 1/4" I.D. — 18" PCE extension wand — fan pattern spray nozzle — Knapsack type web strap. **$31.50**

All Prices F.O.B., Mount Vernon, N.Y. All Prices Subject to Change Without Notice. Write for Catalog.

PEST CONTROL EQUIPMENT COMPANY

24 North Bond St. MOunt Vernon 8-1197 Mount Vernon, N. Y.

Maurice Oser, hard working local NPCA convention chairman, and his committee have lined-up interesting array of entertainment for delegates to the Denver convention. Also on tap are several post-convention trips.

NPCA CONVENTION NEWS

National Pest Control Association
23rd Annual Convention
October 16-20, Denver, Colorado

•

Robert R. Schendel, National Chairman
Maurice Oser, Local Chairman

•

The "Business" In Pest Control

What it costs to do business is virtually the theme for one whole morning of the NPCA convention to be held next month at the Cosmopolitan Hotel in Denver, Colorado, October 16-20.

Jerry Goodman of the New York insurance brokerage firm of B. & D. A. Weisburger leads off with a talk on pest control insurance and then opens himself to questions from the floor.

An expert from the University of Kansas school of business administration, Professor John T. Weatherwax, has studied our industry and will report his findings on the costs involved in operating a pest control business.

Pest Control's recent industry survey indicated PCOs wanted more information on advertising, ways to promote public acceptance. In keeping with this interest, the NPCA is arranging with a member of Batten, Barton, Dustine & Osborn, leading New York advertising firm, to counsel delegates on this very subject.

PCOs' Part In Sanitation

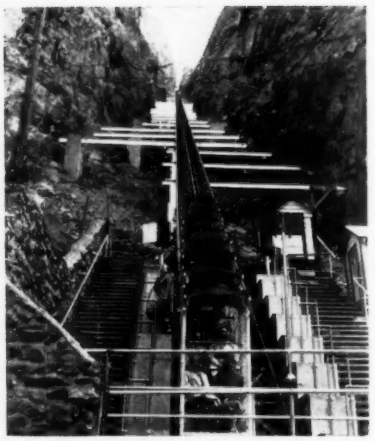
Another center of interest on the NPCA convention program is what PCOs can do to increase their sanitation service. Pest control and sanitation in bakeries is the topic Louis King will discuss. He's head of the department of bakery sanitation for the American Institute of Baking in Chicago. How restaurant sanitation standards involve pest control is expected to be covered by Robert Cameron of the Denver Health Department.

As announced in **Pest Control** last month, the government's grain sanitation program is being stepped up. Convention coverage of this development will include entomological problems by Dr. L. S. Henderson from the USDA Agricultural Marketing Service, rodent and bird control by Dorr D. Green, chief of the F&WLS Branch of Predator & Rodent Control, and role of the PCO in this work by PCO M. S. Buckley, chairman of the NPCA sanitation committee.

Other Keynote Speakers

Here are a few of the other topics and speakers programmed for the galaxy of features on the NPCA agenda. Justus C. Ward from the USDA in Washington will talk on the toxicity of pesticides, hazards and precautions; new techniques in roach and flea control are part of the report coming from the Department of Agriculture's Entomological Research Branch; Don Spencer with other members of the Denver Wildlife Research Laboratory are to cover rodent and bird control and there'll be a panel on this subject headed by J. C. Redd, chairman of the NPCA rodent control committee, with Dr. Philip J. Spear, association technical director, Dorr Green, and others from the Fish & Wildlife lab; plus other topics which will round out the full program to be given in next month's issue of **Pest Control.**

One afternoon will be spent touring the U. S. Wildlife Research lab. outside Denver.



Incline railway at Royal Gorge, Colo., believed to be the steepest of its kind in the world and known to be the shortest and steepest mail route in the U. S., will be seen on one of the post-convention tours.

Termites: FHA, Soil Poisoning

Question of the year for termite operators is "Will the FHA designate TOs as the key group to apply soil poisons for termite protection in new homes covered by government loans?" A partial answer will come at the Monday afternoon session most of which will be devoted to termite problems.

There'll be a report from the Building Research Advisory Board which has been designated by the Federal Housing Administration to determine the best means to repel termites and wood decay.

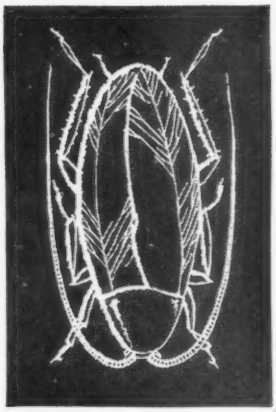
Professor John Osmun, of Purdue, will give preliminary results of his termite research project now being carried out at the University of Illinois where he is working on his PhD.

A panel chosen to answer termite questions is to be made up of L. W. Orr, of the Forest Service's Southern Experiment Station, Justus C. Ward, from the USDA in Washington, Professor Osmun, Dr. Ralph E. Heal, NPCA executive secretary, and termite operator Myron Smith.

And, of course, there'll be plenty of opportunity to ask questions from the floor.

Bring The Ladies

Already announced in our July and August editions of NPCA Convention News is a social program planned to appeal to the ladies as well as men. Mrs. Maurice Oser's Lady Bug committee has outdone itself to provide the ladies entertainment.

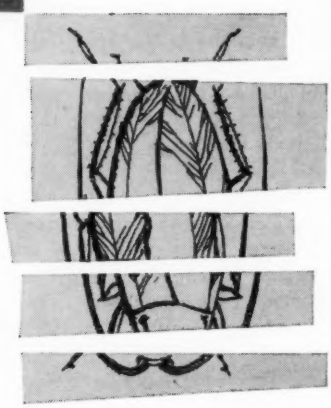


Think first of

DIAMOND LINDANE

for

PEST CONTROL



DIAMOND LINDANE (100%) is highly effective for industrial and household pest control. It is practically odorless, kills three ways—by vapor, contact, and stomach action. It works quickly and continues to kill because of its good residual action.

And when you use DIAMOND LINDANE, as with all DIAMOND products, you are sure of uniform high quality at reasonable price. For information on any DIAMOND product for pest control call your nearby DIAMOND Sales Office or write DIAMOND ALKALI COMPANY, 300 Union Commerce Bldg., Cleveland, O.

Diamond Chemicals for PCO

- LINDANE—100% gamma isomer of BHC. Emulsions, Wettable Powders
- DDT—100% Technical
- DDT—Wettable Powders, Dust Concentrates and Emulsions
- BHC—40% Technical, 12% Wettable Powders, Emulsion Concentrates

DIAMOND ALKALI CHEMICALS

Diamond Chemicals

For Professional Results

Get All 3!

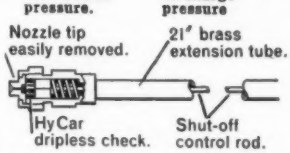
1. No Drip
2. Uniform Discharge Pressure
3. Uniform Droplet Size

USE HUDSON X-Pert* SPRAYERS

with MiniMax* Spraying System

Pump valve limits tank pressure.

Valve regulates discharge pressure



No dripping — HyCar check shuts off spray at nozzle tip.

Minimax Spraying System is the ultimate in precision spraying. It consists of: 1. A valve that signals when tank pressure is 55 lbs. 2. A valve that holds nozzle pressure at a constant 25 lbs. for uniform spray pattern, correct droplet size. 3. Drip-Not* valve that shuts off positively at nozzle, allowing no drip whatsoever.

Other outstanding X-®Pert features: Simplex Inner-Seal * closing — "the higher the pressure, the tighter the seal" . . . Tubular strainer at control valve . . . Large tubular handle (also stores nozzle tips) . . . Footrest . . . Nu-Action* pump . . . Welded tank . . . 5' of Kem-Oil* hose. 3 or 4 gallons, stainless or galvanized steel tank.

Other Hudson Sprayers for Professional Use

Saf-T-Lok* X-Pert 2 gallons

Electric Sprayers

Eclipse*—All Stainless Steel

Capital® 3-Qt. Compression Sprayer

SIGN OF THE BEST BUY

HUDSON

For Complete Information Write

H. D. HUDSON MANUFACTURING COMPANY
589 East Illinois Street
Chicago 11, Illinois

*Trade Mark

A Guest Editorial
written especially for Pest Control
by

Robert R. Schendel
National Chairman
1955 NPCA Convention

Opportunity-Plus

Ours is known as a "Family Convention," where wives and children are always welcome. One of Bill Buettner's great sources of pride was the fact that our convention has always been one of hard work and good, wholesome family entertainment. Our 22nd Annual Convention at Denver will be no exception from this standard.

From a standpoint of "hard work," we know you're going to get a new and clearer concept of "What It Costs to Do Business." Knowing the true cost of doing business is the only basis on which we can wisely set our service charges. Of course, we all want to be brought up to date on the status of FHA and VA requirements on termite control in new housing. I hope you all appreciate the rare opportunity which the visit to the Denver Fish and Wildlife Research Laboratory will afford.

The statement has been made: "The National Pest Control Convention is like church; those who need it most never come." I can't entirely agree with this, as a big segment of our industry is "religious" in its regular convention attendance, but there is certainly room for more new faces. Seven years ago Mrs. Schendel and I attended our first convention in Toronto, Canada, and we haven't missed one since. There I learned about the use of 50% DDT for mouse control. I felt this one technical help was worth the entire cost of the convention trip to me. Each convention has made some valuable contribution to my business

Another vital point in convention attendance is the opportunity to talk face to face with "Doc" Heal, Phil Spear, and any of the other experts who appear before us. Our convention is a sounding board where we as members individually and collectively can let our officers know how the NPCA can better serve us.

Very few conventions are strictly "hard work." We changed from the old three-day convention to the present four-day meeting to give a little more time to see the convention city and its near-by attractions. It would be hard for me to think of a better convention city than Denver, with its interesting attractions and warm hospitality. I took my family with me when I went to meet with the Denver Local Committee on July 9. I don't need to tell many of you what gracious and thoughtful hosts Maurie and Mrs. Oser are. Maurie took us over a part of the route we will travel Tuesday afternoon, Oct. 18. I believe you'll agree that the stop at Central City, a reconstructed mining center of the late 1800's, and the awe inspiring beauty of the Rockies on this trip will be worth a big hunk of your convention cost.

Speaking of convention expense, I wonder if all small and medium sized business operators realize the possibilities of combining vacation with convention attendance and thereby charging the major portion of the trip off as a tax deductible business expense! See the business theme creeping in? Parents of school age children will find that many school authorities believe a week or two of travel affords a child more education than the equivalent time spent in the class room.

I understand John Medoff is going fishing even if he has to chop a hole in the ice. Others have shown interest in big game hunting in Colorado, while Maurie Oser and Byron Reed are having a lot of fun planning post convention trips.

"There's uranium in them thar hills," and you'll get your share of it if you send in that hotel reservation and begin planning right now to meet the rest of us old "sourdoughs" in Denver in October.

4 Big Ways to open New Markets

MGK ROACH CONCENTRATE 933

*

CHLORDANE
(40% EMULSIFIABLE)

*

CHLORDANE
(20% OIL SOLUTION)

*

PYRETHRUM POWDER

McLAUGHLIN GORMLEY KING COMPANY
1714 S. E. Fifth Street • Minneapolis, Minnesota

Please send full details on Roach Concentrate 933, Chlordane (40% Emulsifiable), Chlordane (20% Oil Solution), and Pyrethrum Powder.

*Name*_____

*Address*_____

*City*_____ *Zone*___ *State*_____

Come with your
INSURANCE PROBLEMS
to the
Denver, Colo.

NPCA CONVENTION

October 16-20

No Need to
Search Everywhere or
"Climb the Highest Mountain"
To Find the Best Answers . . .

Dave Weisburger and Jerry Goodman will be on hand to discuss

Any Type of
RODENTICIDE & INSECTICIDE
INSURANCE
for
The Pest Control Operator
and Allied Industries

★

Coverage in representative American Stock Companies on:
Public Liability (including 1080)
Auto Liability
Property Damage, Products Liability
Workmen's Compensation
Accident and Health
And All Allied Lines
As well as Life Insurance and All Types of Employee Insurance Plans

★

Nowhere Else Can You Get The Benefit from 40 Years of Specialized Insurance Service To the Pest Control Industry

B. & D. A.

WEISBURGER

PHONE: LOngacre 5-4356
1440 Broadway New York 18, N. Y.

A Section of PEST CONTROL magazine

TERMITES and other enemies of wood

Hassler Answers Methyl Bromide And EDB Fumigation Queries

During one of the termite sessions at last year's National Pest Control Association Convention in Miami, fumigation expert Karl Hassler, of Los Angeles' Neil A. Maclean Co., was deluged with a flood of questions from the floor on termite fumigation with ethylene dibromide and methyl bromide. Here are the queries thrown into the ring by attending delegates and Mr. Hassler's replies as taken down on a tape recorder.

● Toxicity

Q: **Do you know of any toxicological dangers with EDB?**

A. Hundreds of jobs have been treated that I know of, and similarly quite a number of them have been treated without my presence or advice. I can't conceive how we would create any serious toxicological problem when we're using material that is a liquid as we employ it, at a rate of not over, let's say somewhere between a pint and a quart per 25 cubic feet of soil. That's a lot of dirt and very little liquid. And the liquid itself, from what toxicological data we can get from it, is certainly not above the range of carbon tetrachloride and not nearly as dangerous as benzene vapors.

Q: **I would like to know if there have been any tests made as to just how long the toxicity of EDB lasts in the soil?**

A: I think that would perhaps have to be done today biologically. Actually it has not been done. Our reason for the belief in the success of this method of termite control is simply empirical. We have done many, many jobs and the results seem to be satisfactory. In only one or two cases have I had any reports where porches so treated, or jobs so treated have later been torn out and there the evidence is only that it still "smells." But what the concentration is that a man can smell no one has based any opinions on.

● Soil Poisoning

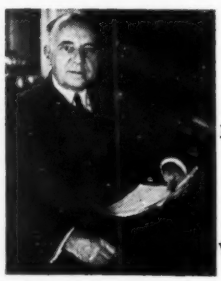
Q: **What effect does EDB have on the soil underneath the slab, when the soil is damp or wet and muddy?**

A: If the water table is high, I wouldn't expect the gas to penetrate beyond the water table, but in most areas the water table does leave some area of moist soil in which there is a considerable quantity of air. In other words, the porosity is very high and gases do pass back and forth rather freely. But, of course, they would not go through soil as the agriculturist knows it at field capacity. You wouldn't get gas penetration through soil that was thoroughly soaked with water; it would make an effective barrier. Fortunately in most of the places where we want to use EDB, such as under porches and houses, the soil is rather dry.

Q: **The soil in our area is clay. How deep would the gas penetrate in clay?**

A: It would depend entirely upon the porosity, and in clays the porosity runs from 3 to 5% in many cases. In wet clay it would not penetrate. The "field capacity" of clay is not as much

(Continued on page 30)



BORER LINES

by

Dr. Thomas E. Snyder

Consultant on Wood Boring Insects and Wood Preservation

Northward Termite Migration?

In May, 1955 winged adults of **Reticulitermes virginicus** (Banks) were found by a termite control operator, Phil Mayer, Jr., in a building on Long Island, N. Y. The most northern previous record for this southern subterranean termite was Philadelphia, Pa. in 1951. This discovery was also made by a termite control operator, W. R. McWilliams, Jr. **Reticulitermes flavipes** (Kollar) has recently been found in Ontario, Canada, at a locality somewhat farther north than previously recorded. It has been in Ontario for many years.

Kalotermes approximatus Snyder, first found in 1917 in northern Florida, was discovered at Cape Henry in southern Virginia in the middle 1920's. The only other records for this species are New Orleans, La. and Saucier (near Gulfport), Miss. Possibly this is the natural range of the termite.

The writer for years has believed that there was no marked northern migration of termites from southern localities. Maybe there is? At Washington, D.C. recently, winters have been much milder than they were 45 years ago. Such weather changes, if consistent in the North, could account for migrations from the South.

Twenty years ago in the San Francisco Bay region there was no

TERMITROL
seals a building with Air-Tight Weather-Tight Extra-Light and Strong

U. S. *fiberthin**

THE FINEST IN COATED NYLON

For a perfect fumigation job. U. S. Fiberthin is the answer to gas-tight sealing of *any* building, reports Termitrol Engineers of Tampa, Florida. Easily handled 40′ x 60′ sections of super-light U. S. Fiberthin are clamped together to fit the size of the building being treated. Fumigating gas does not penetrate, or harm U. S. Fiberthin. It withstands wind-whippage and can be used over and over again. Titan-strong U. S. Fiberthin does *any* covering job *better* because:

- **Light but strong.** Ribbon-like strands of nylon shift to meet strain, provide unbelievably high tear strength. U. S. Fiberthin for all tarpaulin use is four-times as strong, in tear strength, as a #8 Waterproofed Cotton Duck, yet is 40% lighter in weight.
- **Sheds water instead of absorbing it.** No additional weight on building being treated.
- **Long-lasting:** superiority of nylon protected by wear-resisting vinyl or neoprene coating.
- **Resistant to:** flame, oils, most acids, alkalies, salt water, and mildew (even when stored wet).
- **Colors:** aluminum (reflects sunlight and heat), black, white, tan, olive drab, blue, gray or green.

*Patent No. 2,619,705. Dec. 2, 1952

Fumigation Cover made for Termitrol Engineers, Tampa, Fla. by Fielder & Mitchell, Tampa, Fla.

U.S. FIBERTHIN is made in various constructions and weights, vinyl or neoprene coated to meet the demands of the end application. Specify U. S. Fiberthin to your fabricator.

US RUBBER

UNITED STATES RUBBER COMPANY

Coated Fabrics Department, Mishawaka, Indiana

damage to buildings by the dark, western dry wood termite **Kalotermes minor** Hagen. Today there is an increasing amount of damage indicating a northward trend from southern California.

Termite control operators should submit unusual appearing termites to proper authorities. In this manner, important new distribution records may be listed. A dangerous termite imported from the tropics might be discovered. There is also an opportunity for the alert operator to obtain new information regarding the habits of termites.

Past important discoveries by members of the industry include night swarming by normal, dayflying species of **Reticulitermes** in Tennessee and Illinois; the location of large numbers of supplementary queens in an infested building in Tennessee; the first reporting of live colonies of the Pacific Coast **Zootermopsis angusticollis** (Hagen) in shipments of lumber to Pennsylvania and Ohio; infestations of dry wood termites in the woodwork of buildings in several states and the District of Columbia, outside of their normal occurrence. Keep up the good work!

Fumigation Queries

(from page 28)

as it is for loose classified sand.

Q: You said that adequate treatment takes from a pint to a quart of EDB per 25 square feet (Hassler breaks in and says "cubic feet"); Now wait a minute, you said "cubic" feet, but if you're not going to go below that basement slab and just drill a hole through it and pour, you have to assume that you're going down one foot. Is that right?

A: You don't have to. Gasses expand in three dimensions. When they evaporate they occupy space in three dimensions. You drill a hole through the slab; put your material in; and put a plug in there.

Q: **All right, but then are you, in effect, saying that you are going to use one pint or one quart per 25 square feet of basement area?**

A: That would be, say, five square feet and five feet deep. In other words, I don't believe you can create a very toxic condition in soil, that is stuff coming back up through a slab or through permeable materials of any kind, by the use of materials as toxic as ethylene dibromide at the rate of a 15% formulation of between a pint and quart to 25 cubic feet in soil; that's a whole yard of soil, a truckload.

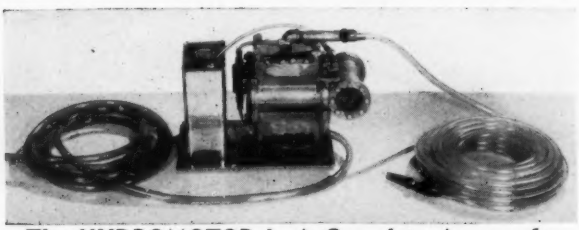
Q: **You're talking about 25 cubic feet of soil, but how do we know how much depth we're treating under the slab to make cubic feet? I say you've got to call it "square" feet.**

A: We don't know with a great deal of accuracy how far down the EDB goes, but I have measured concentrations of material 10 feet from its point of application, vertically, beneath, under. That has been done.

Q: **I say you have to base your treatment on "square" feet based on area, rather than depth.**

A: When you fumigate, you fumigate volume which consists of three dimensions. When we poison the air in a certain volume of soil we expect a barrier on top to keep any significant amounts

New! IDEAL SPRAYER for TERMITE SOIL TREATING



The HYDROMOTOR Is A Complete Answer for Heavy or Light Spraying

For treating soil for termites or treating outside areas for Ants, Spiders, Sowbugs, Centipedes and other insect pests, the new Hydromotor Spray Unit gets the insecticide deep into the ground where it **lasts** . . . assures positive kill at lowest cost. Water pressure operated, it requires no other power supply — makes even small spray jobs profitable.

CHECK THESE IMPORTANT FEATURES:

Portable—weighs only 38 lbs.
Dimensions: 12½" High
18½" Long
9" Wide
Any emulsifiable insecticide may be used.

Costs nothing to operate — requires only water pressure.

Designed to last for years of every-day use.

Just a Few of Many Satisfied Users:

Delk Pest Control, Fresno, Calif.
Lloyd Pest Control, San Diego, Calif.
Columbia Pest Control—Los Angeles & Salt Lake City
San Diego Exterminating Co. San Diego
Pest Control Services, Inc. Indianapolis

ORDER TODAY!

Prove to yourself that the new Hydromotor Spray Unit will do the job faster, more effectively and economically. $329.50, F.O.B. Los Angeles.

Pest Control Products Co.
6201 Santa Monica Blvd.
LOS ANGELES 38, CALIF.

ACME . . . the Only Gas Mask with the "Picture Windows"

You never have that "horse-blinder" feeling with the Acme Full-Vision gas mask. Its patented, larger lenses provide full, natural vision with greater comfort along with protection you can rely on. Other Acme features include easier breathing, less fogging, and increased audibility. There's an Acme Mask to protect you against every gas hazard in the pest control industry. Write for Bulletin 541 describing Acme Canister gas mask equipment.

Acme Protection Equipment Co.
1225 Kalamazoo Street, South Haven, Michigan

of it from escaping in directions which we can't control.

Q: **What's the third dimension? That's what is bothering us. How far down do we go?**

A. I don't know how far we actually go sideways. I conceive of fumigation, when you're poisoning a volume of air, as three dimensions. In other words, when you fumigate a building, you don't talk in "square feet," it's so many "cubic feet." There is so much air under the slab which you have to poison. If I have a slab under a porch, I can figure that there's 800 to 1,000 cubic feet of soil which is of significance under that porch. I want to make all of that soil untenable for termites over a certain period of time. So I'm dealing with soil which is usually somewhere between 12 and 20% porosity. I am able to poison all of the air in the air spaces in that soil. Well, that is three dimensions. The depth depends upon what concentration you want to count. There are extremely minute amounts that probably go 5, 10, 15 feet. In soil fumigation with methyl bromide, we're killing nematodes and fungus diseases at five feet through the soil. We apply it on the top with a barrier over the top. How much is at 10 feet? I don't think our instruments would measure, but we are able to measure it biologically at five feet.

Q: **I think the question that has come up here is this: Suppose your slab was on a very porous soil. The gas would trickle down, say 25 feet, therefore according to your theory of a pint to a quart to 25 cubic feet, you'd probably have to put a hole every square foot.**

A: No, because gas is diffused. It doesn't stay where you put it. It evaporates and normally occupies all of the space that is available to it.

Q:**If you have that condition where you have 25 cubic feet, to use your figures, of porous soil, and the gas that you put in went straight down 25 feet, wouldn't you have to put a pint for every square foot in order to properly keep-up the concentration for that area?**

A: No, you put in a pint for every 25 cubic feet. I usually figure the gas goes down four or five feet. I don't carry it all the way to the center of the earth.

Q: **In new homes in which living rooms are something like 20 feet square, you drill through the slab and pour in EDB through a funnel. I was wondering if you have a better method, say in a lage area like that where you have a three dimensional spread on your gas. Is there any easier method whereby you could do it through the side underneath the slab and push your instrument for a considerably larger area and inject your chemical in another way rather than go down through the middle of the living room?**

A: I think that can be done. In fact many times I wish that I had the tools to do a job like that and I think as the popularity or the success of the method grows, tools will be made and offered to the termite operator for doing that sort of a job. If the method becomes popular I am sure tools will be developed that are better than we have today.

● **"Dry-Woods" Fumigation**

Q: **Is the type of construction on the West Coast and also down in Florida the reason why you have to use a tarp to wrap up a house for dry wood termites, when**

STOMPING
THEM TO DEATH—

—isn't the way an alert P.C.O. handles his fumigation jobs—and, compared to heated Methyl Bromide, the older methods of space fumigation are almost as inefficient as stomping pests to death! Heated Methyl Bromide requires no time to vaporize—the fumes go into action right away, penetrate faster and deeper! Effective lethal concentration is reached immediately, and maintained longer. There is no possibility of a 'half-kill,' with its necessity for time and profit-gobbling re-works!

The heating unit pictured at the left, Black J's Model "A" has been developed through the refinement of several prototype designs. Light, strong, compact, and easily-portable, —it weighs only 144 lbs., fully-loaded— this is the first Methyl Bromide heater which doesn't have to be assembled on the job. It can be carried to the job filled with fuel and water, lifted off your truck and, within minutes, be vaporizing the output of two tanks of Methyl Bromide simultaneously.

The "Pestmaster" Methyl Bromide shown with this heater is a product of Michigan Chemical Corporation, St. Louis, Michigan

BLACK J CHEMICAL PRODUCTS

FREE literature describing this Methyl Bromide heater, and how it can raise your profits, is available from: BLACK J. Chemical Products, 1643 12th Street, Santa Monica, Calif.

we in the East don't have to for the old house borer?

A. We only tarp, I'd say, less than half the jobs in California. The rest of them are all stucco jobs with roofs that don't need to be tarped. I'd say between 25 and 30% of the jobs done in southern California are tarp jobs. The rest of them are done merely by sealing the cracks in windows and vents with paper and tape or by some other suitable means.

Q: **Karl, what are some of your failure experiences with dry wood termite fumigations?**

A: Failures are chiefly due to laxity in sealing methods. In other words, if you can hold your gas, you can kill termites. But the problem of holding gas in the various types of structures which a termite man may be asked to fumigate are infinite. You have tile roofs, built-up roofs, and you are also limited sometimes by the economics of the situation. You can only spend a certain amount of time, labor and material on a job.

You thought you could stand on the roof but it's a little too steep and it's getting late in the afternoon and you don't want to pay your help any overtime, so you do the job the best you can and leave it. It's that sort of problem. It has not been due to failure to use enough gas. I think the gas dosages in Southern California have been liberal and I would say today we are using an average of about two pounds per thousand cubic feet. There are a few jobs at three pounds per thousand cubic feet, but I'd say the average would be below that.

● **Odors**

Q: **What are some of the methods you have used to overcome your odor problem with methyl bromide fumigation?**

A: Experience and care in inspecting the house before you fumigate, and to prevent further troubles, very careful inspection of the house after you fumigate so that you can find it before your client does.

Q: **Then what happens after you find it?**

A: To treat a davenport which has been shampooed with some of these new cleaners and then fumigated, there's nothing I know of except new upholstery. That's rather expensive. We can avoid odors by getting more of the gas in the critical areas, such as the attic, the walls, and the sub-areas. Also take some measures to keep concentrations from building up as rapidly or as high in the living area of the house when there are no insects in this part of the home which are under consideration. In other words, you're not doing the floor for beetles, you're doing the house for dry wood termites and the living areas of the house are not really involved.

Fast, Easy Drilling In Concrete

The New!

SYNTRON

ELECTRIC HAMMER DRILL

- **Exclusive, Automatic Rotation of Drill Bit**
- **No Laborious Hand Turning of Drill Chuck**
- **10 Times Faster Than Hand Methods**

The only Electric Hammer Drill available with automatic, self-rotating drill bit. Operates at high speed for fast, clean production drilling.
Electromagnetic drive — only one moving internal part.
Electric Hammer models for chipping, cutting, pointing, scaling, etc. also available.

Write today for complete Tool Catalogue — Free

SYNTRON COMPANY
790 Lexington Avenue Homer City, Penna.

Jury Finds TO Guilty of Fraud

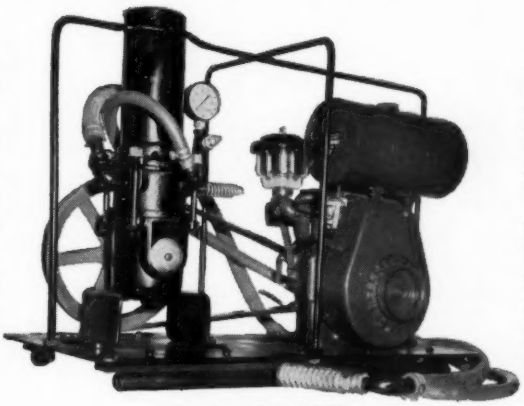
A Ballinger, Texas jury recently found an Oklahoma termite operator guilty of swindling $491.40 from an elderly widow and sentenced him to two years in prison. The TO was alleged to have taken this amount in fees for "exterminating" termites which, the state claimed, were not present in the first place.

R. L. Showalter of Abilene, Texas Pest Control Association executive secretary and TO Lester Vick, of San Angelo, both testified that neither could find any evidence there had been any termites on the premises.

Another FIRST For PRESHUR-MITE

A NEW Portable Spraying & Termite Treating Unit With A Pump That Does Away With Your Pumpaches

NEW DIAPHRAGM PUMP Eliminates expensive break-downs, can be repaired on the job in less than ten minutes with extra kit which comes with each unit. Unit comes fully equipped with 100 Ft. 3/8" I. D. chemical hose & Accessories. Wt. Approx. 145 lbs.



Portable unit shown handles abrasive & corrosive chemicals used in termite, pest, weed & grass control applications without damage to pump's pumping parts. Capacity 6 gal. per minute, pressure adjustable to 175 P.S.I. Agitates 55 gal. steel drum of solution thoroughly.

Catalog No. 1B119

EWING MANUFACTURING COMPANY

MAKERS OF HIGH QUALITY PEST CONTROL EQUIPMENT SINCE 1936

P. O. BOX 1986 JACKSON, MISSISSIPPI, U. S. A.

Distribution *makes* the Difference in...

RESIDUAL SPRAYING

SPRAYING SYSTEMS TeeJet® SPRAY NOZZLES

Distribution of liquid particles are very important in residual spraying. TeeJet Spray Nozzles give you uniform distribution over entire pattern area . . . and proper atomization. Available in any capacity, nozzle assembly includes interchangeable orifice tip and strainer. Write for Bulletin 58.

FOR EASIER SPRAYING ON THE JOB

ADJUSTABLE CONEJET

With ¼ turn of tip you have full range choice of spray from finely atomized cone to solid stream. Fits any TeeJet body or Trigger TeeJet. Write for Bulletin No. 63.

TRIGGER TEEJET

A precision, positive shut-off valve. Lock catch holds valve open when desired. Light in weight, comfortable. Supplied with straight or curved extensions. Use with any TeeJet Tip. Write for Data Sheet 4675.

SPRAYING SYSTEMS CO.

Engineers and Manufacturers

3221 RANDOLPH STREET • BELLWOOD, ILLINOIS

Meet Competition

with

Vaccinol

TESTED — 25th YEAR

BONDED CHEMICAL

For Termite & Powder Post Beetle Control

BONDS AVAILABLE TO APPROVED LICENSEES

Try a Few Drums and Be Convinced

HURRY - HURRY!

Closing Exclusive Territories Fast.

Write Today for Full Details

VACCINOL CHEMICAL COMPANY

2487 Pennsylvania P. O. Box 3205 Telephone WH-8-1166

MEMPHIS 9, TENNESSEE

Solve Your Indoor Fly Problem!
DISPOSABLE AEROSOL INSECTICIDE
Professional 3-Lb. Aerosol
Non-Irritating!
Industrial Strength Formulation
D.A.I. is safe to use in restaurants, hospitals, food plants, super markets and other food-selling establishments—wherever flying insect control without hazard to humans is essential.
3/4-lb. Regular Size D. A. I. BOMB
Handy, disposable, economical! Knock-down strength of several gallons of ordinary spray.
Packed 6 per Carton.
Each $2.40
Carton $12.50
*U. S. Patent No. 2,267,385
DISPOSABLE AEROSOL INSECTICIDE
SURE KILL FOR FLYING INSECTS
The D.A.I. quick knockdown kill formula is based on Pyrethrum, Allethrin, Sulfoxide, and PRALYTEX Rotenone*—the safest of known insecticide chemicals.
ECONOMICAL TO USE
Each bomb treats over 600,000 cu. ft., or 10,000 cu. ft. over 60 times.
NO DEPOSITS—NO RETURNS
List Price $8.70 per 3-Lb. Bomb. Each unit is sold complete with no extra valves or nozzles to buy, pictured as it will be shipped.
Easy D.A.I. Way
One-hand, one-finger operation! As easy to treat ceiling corners as waist-high areas. When bomb is empty, just throw it away!
Deposits and returns eliminated.
Always ready and easy to use.
Irritation free—safe to humans.
OBTAIN FROM YOUR LOCAL INSECTICIDE SERVICE FIRM
WHITMIRE RESEARCH LABORATORIES, INC.
339 S. Vandeventer Ave. • St. Louis 10, Mo.
wrl

PRE-SOLD FOR YOU!

This ad is being read by several hundred thousand prospects. It is appearing in many national magazines covering super-markets and other food stores, food and drink processors, hotels, motels, restaurants, hospitals, and a host of other establishments with continual insect problems.

DON'T TAKE OUR WORD FOR IT!

Ask The Man Who Sells D. A. I.!

At The Show...

...talk to other P.C.O.'s who are selling and profiting from D.A.I. Find out how their customers like it...how much repeat business it means.

Come to the Whitmire Booth and see the sales helps available to you... discuss your aerosol sales program ...satisfy yourself that D.A.I. is everything we say.

Environmental Sanitation in the Control Of Pests of Public Health Importance

Concluding Installment

by

WILLIAM C. GIBSON

Associate Professor of Public Health Engineering
School of Public Health, University of Michigan, Ann Arbor

This is the second and concluding installment of William C. Gibson's article on environmental sanitation. In July the author covered the three main steps in preventing insects and rodents from access to food and shelter: (1) construction, (2) storage, (3) cleaning. In this issue he takes up the PCO's duties and responsibilities sanitation-wise and clarifies the 3-way triangle of cooperation that must exist between management, professional sanitarians and our industry.

● Role of the PCO

What is the PCO's role in the practice of environmental sanitation in the establishments which he services? Obviously, he is not prepared to take over these practices in order to have them accomplished as they should be. Essentially they remain the responsibility of management. Yet the effectiveness of the PCO's work depends upon the attitude and attention which management gives to measures involved in construction, storage and cleaning. Frequently management is unaware of the importance of these factors and of their relationship to effective pest control operations. He contracts for the services of a PCO and expects him to solve all of the related problems with pesticides. He is critical of the operator when infestations re-occur and when service fees continue. This criticism is prejudicial to the interests of the pest control profession.

The only answer I can suggest in this dilemma, and the solution that must prevail for effective pest control work, is for the PCO to assume the responsibility in all of his contract work of stressing the importance of environmental sanitation to the management of establishments he services. This means the PCO must be equipped to make recommendations for preventive sanitation and to define the responsibility of management for carrying out such procedures. Unless the responsibilities of both the operator and management are clearly understood by both parties, effective pest control and harmonious public relations are jeopardized.

The technical know-how related to environmental sanitation procedures may be gained by attending short courses such as the annual conference at Purdue University; by attending annual short courses such as the one given at Michigan State College; by study of the excellent Technical Releases, Service Letters and manuals prepared for members of the National Pest Control Association; by subscription to **Pest Control** magazine and by close cooperation with the sanitation division of local health departments. Not only is it essential for key members of pest control organizations to be informed on technical matters related to environmental sanitation, it is also necessary for service and supervisory personnel to be informed. This means such instruction must be included in employee training programs.

Recommendations to clients concerning their responsibilities for environmental sanitation measures involving construction, storage and cleaning should be made in writing to top management. These recommendations should stress that the suggested improvements will make the pest control work more effective, will reduce reinfestations and will make control work less expensive. Stress should be placed on the preventive as well as corrective aspects of any infestation. Preventive aspects are largely the responsibility of the client and the corrective or killing aspects are the PCO's responsibility.

A number of progressive pest control organizations use sanitation survey forms to record items needing special attention at the time of the initial inspection of the client's establishment and at the time of subsequent service calls. To be most effective these inspection reports should be directed to top management and should be used to re-emphasize the responsibility of management for preventive pest control measures. Advice and counsel on preventive pest control measures is a sales promotion technique of real value to the PCO and his client. When properly developed, it should be a service for which clients would be willing to pay as they now pay for pesticide applications.

This industry has made a good beginning in the establishment of standards of performance in certain phases of work. This effort should be expanded to encompass other aspects of pest control. Such standards will be mutually beneficial to the pest control operator, his clients and to the public at large. They will define: (1) What constitutes satisfactory insect and rodent control; (2) What constitutes the responsibility of the PCO for making recommendations to management for necessary preventive measures; (3) What constitutes the responsibility of management for carrying out good preventive measures;

The author wishes to acknowledge with thanks the suggestions of Mr. Harlem B. Ives, Sr., of the Rose Exterminator Company, Detroit; Mr. J. Watkins of Vogel-Ritt, Inc., Detroit; Mr. Norman R. Ehmann, Entomologist, City Health Department, Los Angeles, and Mr. Walter F. Snyder, Executive Director, National Sanitation Foundation, Ann Arbor.

continual insect problems.

Sanitation Survey Form
For Food Stores and Supermarkets

COMPANY STORE NO. ADDRESS	Structural Cond.	Ratproofness	Screens	Toilet Facilities	Garbage Disp.	Refuse Accum.	Fruit Flies	Stored Prod. Ins.	Roaches	Flies	Ants—Other Ins.	Rodent Harb.	Rat Activity	Mouse Activity	Storage Prac.	Housekeeping	Cleanliness	
GENERAL																		
GROCERY DEPT. GEN.																		
CEREAL — FLOUR SEC.																		
CANDY SEC.																		
PRODUCE DEPT.																		
MEAT DEPT.																		
BAKERY DEPT.																		
OUTSIDE AREA																		
TOILETS																		
STOCKROOM																		
BASEMENT																		
BUILDING STRUC.																		

E—Excellent
S—Satisfactory
P—Poor
U—Unsatisfactory

Date _____

Inspector _____

Sample sanitation inspection form (above) is similar to type some PCO firms use to record places needing special attention when initial inspection of client's establishment is made.

(4) What constitutes the responsibility of the PCO for effective pesticide operations, including attention to the dangers to people, pets and foods, and (5) Other related items of importance.

● **PCO Benefits**

In conclusion, I would like to briefly summarize the benefits of environmental sanitation to the pest control operator.

First, it enables both the PCO and his client to obtain more effective pest control. This means customer satisfaction through less expense to the client for control operations. Customer satisfaction means more business as management becomes convinced of the value of professional pest control service.

Second, environmental sanitation promotion is another service which can be sold by the PCO as soon as management is aware that the pest control industry is equipped to give sound preventive advice and consultation. Opportunity awaits the development of effective techniques by the profession and individual PCO to perfect another service which clients will purchase as a part of good pest control operations.

Third, attention to environmental sanitation is another professional contribution the operator can make to develope an environment in which men can thrive, through more effective control of insects and rodents which are prejudicial to his health, comfort and well-being.

In the final analysis, selling environmental sanitation is an important part of selling pest control. The application of pesticides is only part of the job. Preventive environmental sanitation is the rest.

Bibliography

Dawson, J. C. 1949. Insect Control in Food Processing Plants. Modern Sanitation. August.

Ehmann, N. R. Environmental Sanitation As Applied to Pest Control in Bakeries. Los Angeles City Health Department.

Fulton, H. L. 1951. Integrating Public Health and Commercial Rodent Control. American Journal of Public Health. September.

National Pest Control Association. Service Letters.

Ibid. Technical Releases.

Du Pont Weed, Brush Killer

A new, more concentrated formulation of "Ammate" weed and brush killer has been announced by the Du Pont Company, Wilmington, Del. Called "Ammate X," the new formulation reportedly contains 95% of the active ingredient, ammonium sulfamate, instead of 80%.

Du Pont recommends this chemical as a foliage spray for control of woody plants, and as a stump treatment to prevent resprouting. "Ammate X" is nonvolatile, and does not leave soil unproductive for long, Du Pont says. It reportedly contains a corrosion inhibitor, and is low in toxic hazard to warm blooded animals when used as directed.

New Dolge Germicide

A new multi-purpose germicide, deodorizer is now being manufactured by The C. B. Dolge Co., Westport, Conn. Called Mintol, the new product reportedly has successfully met the new "Use Dilution Confirmatory Test" on S. Cholerasuis in accordance with current Food and Drug Administration testing methods and has been given a coefficient of 9. It is said to dilute economically, 1-100 parts of water for disinfecting and 1-200 for deodorizing.

Recently-elected National Sanitary Supply Assn. officers and directors meet in Chicago to study association plans for the coming year. Left to right (front row): **Burton L. Feinson,** eastern regional v.p., American Dispenser Co., Inc., New York City; **George H. Bruesch,** treasurer, Frank Miller & Sons, Inc., Chicago; **Ford Lachman,** western regional v. p., Paul Kass Supply Co., San Francisco; **Lacy E. Crain,** president, Conco Chemical Co., Dallas; **Philip Shore,** director, Shore Metal Products, Los Angeles; **Milton A. Zelinkoff,** secretary of the board, The Zelinkoff Co., Wichita. Left to right (back row): **Bernard T. Kelly,** assistant executive secretary, NSSA, Chicago; **Jacob Kahn,** vice president, Windsor Wax Co., Inc., Hoboken, N. J.; **C. R. M. Sheppard,** director, Fenole Chemical Co., Jacksonville, Fla.; **John P. Stokes,** southern regional v.p., Buildings Equipment & Supply Corp., Richmond, Va.; **H. G. Kiddoo,** director, Western Chemical Co., St. Joseph, Mo.; **Arnold H. Groth,** director, Packer-Scott Co., Seattle; **Gordon E. Kent,** director, The Kent Co., Inc., Rome, N. Y.; **Ernest Cooper,** central regional v.p., Clarke Sanding Machine Co., Muskegon, Mich.; **Marvin Anderson,** southwestern regional v.p., Louisiana Paper Co., Inc., Shreveport, La.; **Leo J. Kelly,** executive vice president, NSSA, Chicago.

A Real 'Knock-Out' PROSPECTS EVERYWHERE STEADY REPEAT PROFITS

J-119
5 LB. AEROSOL
Wonder Bombs
Will treat over 1,000,000 cubic feet
LIST PRICE $14.50

Add $3.75 refundable deposit on each cylinder to the above price. All cylinders of 2 dozen or more can be returned at our expense. All orders of 2 doz. or more shipped prepaid.

New "WIFF" AEROSOL *Wonder Bombs*

READY-TO-USE, WITH NO COSTLY ADDITIONS, OR ATTACHMENTS.

Pat. No. 2,321,023
Contains .50% Pyrethrins and 4% Piperonyl Butoxide for control of **flies,** mosquitoes, roaches, bedbugs, carpet beetles moths, gnats, ants and all other household insects.

J-3 NEW, READY-TO-USE
3 lb. DISPOSABLE CYLINDER
No returns, no extra valves, nozzles, etc. Weighs approx. 4¾ lbs. Easy one-hand operation. Treats about 1,000,000 cubic feet.
LIST PRICE $8.70
All orders 100 lbs. or more shipped preaid

GUARANTEED RESULTS
"WIFF" Wonder Bombs combine outstanding safety with fast, positive knockdown and kill, and time-saving convenience.

"WIFF" is approved for use, wherever food is processed or handled. It is non-inflammable non-toxic, non-injurious to humans or other warm blooded animals when used as directed. Packaged under government safety regulations.

NOTE: Save money . . . don't waste those empty reusable cylinders you have lying around. We can refill them for you if they are in good condition. You get the benefit of Wiff Aerosol Bombs and Save on the refundable cylinders.

JOBBERS AGENTS
Exclusive protected territories available. Write for details on liberal discounts and quantity prices.

JASGO *Chemical Company* **1128-30 St. Johns Place, Brooklyn 13, N. Y.**
Serving the Industry Since 1936
"The Dependable Source for Dependable Products"

You Can MAKE MORE MONEY

by using and selling

FUMO-KILL

The New, Safe Fumigant that will kill
Spiders, Moths, Mosquitoes, Silverfish, Wasps, Waterbugs, Bedbugs, Roaches, Etc.

FUMO-KILL is truly the modern method of insect extermination. Light match to contents in can will produce fumes—NO FLAME. Non-hazardous. This amazing **FUMO-KILL** insecticide has been tested, and is registered with the U. S. Department of Agriculture.

FUMO-KILL has the following advantages:

EASY TO USE: Fine Vapors destroy pests and their nests.
ECONOMICAL TO USE: Two-ounces Fumigates up to 6,000 cubic feet.
EFFECTIVE TO USE — Vapors Penetrate Entire Room—Every Crack and Crevice

Special Offer!

Order 1 dozen 4 ounce cans at $13.50 per dozen, and get one 4 ounce can FREE

FUMO-KILL can be obtained in 2 oz. (enough for up to 6,000 cubic feet)—4 oz. and 1-lb cans.
Cost of 12—2-oz. Cans . . $7.50 per doz.
Cost of 12—4-oz. Cans . . $13.50 per doz.
Bulk . . . . . $4.50 per lb.

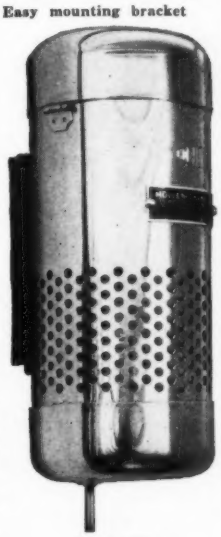
Delivery Charges Prepaid
For complete information write or phone today.

MAR-MEL PRODUCTS, INC.

Phone: Van Buren 6-2060-61
753 South Kedzie Ave. Chicago 12, Illinois

NOW AVAILABLE!
Repeat Sales for Extra Profits

Tamper-proof hinged cover
Self-locking inner spring
Easy mounting bracket



Your own company's nameplate

Mol-O-Matic*

*Trade Mark

DRIP MACHINE

This completely automatic drip machine, with constant evaporation-rate, for any standard drip fluid, refreshes the air and prevents trap odors from escaping. It is easily installed, using 3/16" tubing to toilet bowl or urinal. Monthly refilling creates repeat profits. It's chrome plated, modern design, harmonizes with all lavatory fittings. Packed one dozen to a carton.

Dealer franchises now available.

Mollen Chemical co.

1850-52 North Uber St. Phila. 21, Penna.
Telephone FRemont 7-0101

What's NEWS In The Industry

PCOs Not Called On In Early Stages of Diane's Aftermath

Most local governments are not prepared to instigate PCO-municipal pest control programs in the period immediately after a flood strikes. This fact was learned when **Pest Control** made several spot checks by long distance telephone to hard-hit northeastern cities several days after Hurricane Diane had dumped millions of gallons of water on flood-stricken areas.

In Waterbury, Conn., PCO Frederick W. Dietz, of Dietz Exterminating Systems, Inc., said his city was not co-ordinated for emergency pest control programs. "Now is the time for such a project to begin, as the flood waters are receding," Mr. Dietz said, "but it looks as if the city is going to have operators just take care of their own problems when customers call in. Waterbury has made no effort to have pest control operators band together for emergency action, such as pooling equipment and supplies, and there's not much we can do without municipal leadership. Possibly as the flood waters go down even more, we'll be called in."

Efforts, just before press time, to learn something tangible about pest control operations in the flood-ravaged Pennsylvania Pocono Mountains area, were mostly negative. PCO Arthur Hammel, of Reading, who maintains an office in the almost totally destroyed town of Stroudsburg, said all he learned was that his serviceman was safe. "Reading has dispatched Civil Defense workers and doctors to the Poconos, but it's too early to know if they want the services of PCOs. So far Reading PCOs have not been contacted by local officials about emergency pest control measures."

From Philadelphia, William Brehm, of the B. & G. Company, reported that he had heard of no plans to utilize the services of PCOs in the stricken areas adjacent to Philadelphia.

Other efforts to reach operators in New England failed because of destroyed phone cables, but the general trend seemed to be that local governments were not planning to use the services of PCOs, at least in the early stages of flood recovery.

New Florida Pest Control Association Officers are installed at group's recent annual convention in West Palm Beach, Fla., by **Harlem Ives** (fourth from left), National Pest Control Association president. Standing (left to right) are: **Harvey Clark,** director, Clark Pest Control, Jacksonville; **Sam Walkup,** director (re-elected), Orkin Exterminating Co., Orlando; **D. L. McCullough,** director (re-elected), Sanitary Pest Control, St. Petersburg; **Mr. Ives; R. L. Lewis,** secretary-treasurer (re-elected), Walker Exterminating Co., Daytona Beach; and **W. B. Clements,** president (re-elected), Homes and Grounds Service, Leesburg. Seated (left to right) are: **Mrs. Clements;** and **Herman Fellton,** Getz Exterminators, Inc., St. Louis, Missouri. 1956 meeting will be in Orlando.

NPCA Publishes Serviceman's Manual For Members

The long awaited **Serviceman's Manual,** published by the National Pest Control Association, is now off the press and being circulated to its member firms. Distribution began the last part of July and climaxed over two years research and editing.

Liberally illustrated with photographs on what the serviceman should know and do, the copyrighted 120 page book contains the best thinking available on what will aid servicemen in general pest control. It does not cover fumigation, termite control or other specialized fields.

Eleven major headings are included in the how-to-do-it volume: **1.** the serviceman's code; **2.** the serviceman's job; **3.** getting along with people; **4.** serviceman as the company's representative; **5.** basic steps in pest control; **6.** knowing equipment; **7.** knowing chemicals; **8.** knowing pests and signs of pests; **9.** getting the pests out; **10.** removing the "cause" of pests; and **11.** keeping out of trouble.

The manual has already been hailed by industry leaders as filling a long needed void in servicemen educational training programs. Philip J. Spear, NPCA technical director was editor.

Pest control companies which become NPCA members will be entitled to receive one free copy of the **Serviceman's Manual.** For details write the association at 30 Church St., New York 7, N. Y.

NCPCA Meets July 15-16

Advertising and legislation dominated the annual mid-summer meeting of the North Carolina Pest Control Assn. held in the City Hall, Carolina Beach, July 15-16.

One of the conference highlights was an interpretation of the operation and enforcement of North Carolina Structural Pest Control Act, which went into effect July 1, by L. Y. Ballentine, North Carolina's Structural Pest Agriculture. He said no licenses would be issued or rules and regulations written until the first meeting of the Structural Pest Control Commission.

The 5-man commission, appointed by the governor, consists of Walter H. Wilson, Wilson Exterminating Co., Winston Salem; I. H. O'Hanlon, Fumigators, Inc., Raleigh; Dr. Clyde F. Smith, head of entomology, State College, Raleigh; Dr. D. L. Wray, entomology division of the North Carolina Department of Agriculture, Raleigh; and John L. Reitzel, Assistant Commissioner of Agriculture, Raleigh, Mr. Ballentine said.

The 70 attending NCPCA members and guests heard how the association membership could take advantage of trade mark advertising when J.J. Currin, trade mark representative of the Southern Bell Telephone and Telegraph Co., stepped to the rostrum.

During the meeting members decided to hold the annual PCO Short Course at State College, Raleigh, January 31-February 1.

PCO's... *never be caught with your "Parts down-town"*

REPAIR BOX AND PARTS KIT

For Your B & G Sprayer

A permanent heavy-duty repair box with a generous supply of all necessary repair parts at a substantial reduction. In your office or truck — the right part is easy to find — saves time!

Ample extra room for repair tools. Sprayer care becomes an organized routine with all material in one spot.

$27.50 complete with parts. F.O.B. Philadelphia

In ordering, specify your type of sprayer shut-off. Trigger-Teejet; Schrader; or No-Drip.

STURDY B & G SPRAYER CARRYING CASE

This new case protects your sprayer when you travel to a job and has the proper professional appearance you want.

Sturdy construction of hard vulcanized fibre.

Varnished inside and out.

Double reinforced bottom.

Steel Clover-leaf corners.

Draw-bolt catch.

$9.75 F.O.B. Philadelphia

GET ALL THESE PARTS . . . YOU SAVE OVER 15%!

8" x 12" x 4" enameled steel box; 3 hose units; 2 brass handles; 2 brass caps; 1 pump tube cylinder; 2 pump plunger rods; 2 large brass pump washers; 2 brass pump washers; 4 brass pump nuts; 6 pump tank gaskets; 8 pump cup leathers; 12 pump check valves; 8 Multeejet packings; 1 Multeejet tip; 4 hose coupling washers; 2 brass extensions; 2-100 mesh strainer assemblies; 2-100 mesh screens; Plus over 25 assorted shut-off valve parts and washers.

Manufacturers and Distributors of Pest Control Products

B & G COMPANY

Plumsteadville, Pennsylvania

"Serving the Pest Control Industry"

Use Both to Kill Rodents!

NAPESCO'S

EAT-KIL

(Pival in a highly acceptable grain base)

New* Ready to Use Tastier Rat and Mouse Bait

*Bait based upon research studies at Purdue University and especially developed for the pest control industry.

½ lb. pkg.	$ .50 (48 per carton)	25 lb. pkg.	$ .40 lb.
1 lb. pkg.	.90 (24 per carton)	50 lb. pkg.	.38 lb.
3 lb. pkg.	2.00 (8 per carton)	100 lb. pkg.	.36 lb.

Freight paid on orders over 150 pounds. Write for quantity prices

BAIT STATIONS

No. 1 Large Round Rat Station 14" diameter, 5½" deep **$1.60 each**

No. 2 Small Round Mouse Station 7" diameter, 3" deep **82c each**

No. 3 Rectangular Mouse Station 6" x 11" x 3" deep **$1.00 each**

All Metal Equipped with Swivelling Self-Feeder

NAPESCO, INC.

East of the Mississippi Order from
Ernest Andersen
NAPESCO, INC.
Route 1, Dresser Road
Lafayette, Indiana

West of the Mississippi Order from
Harlan R. Shuyler
NAPESCO, INC.
3138 State Avenue
Kansas City 2, Kansas

Be Ahead 4 Ways With UNI-VAP Insecticide Vaporizer

UNI-VAP IS DESIGNED AND GUARANTEED TO PROVIDE:

- ★ **Effective Insect Control** by vaporization of lindane.
- ★ **Trouble-free operation** with Westinghouse adjustable UNI-THERM Thermostat.
- ★ **Long Life** with Chromalox Heating Element.
- ★ **A LIBERAL PROFIT FOR YOU.**

Each unit is covered by $100,000 product insurance. Join the leaders. Switch to Universal, the most reliable in the vaporizer field.

UNIVERSAL LINDANE in 1 oz. heat sealed, leakproof packets, and in 1 lb. cans.

Write for new lower prices and literature.

Universal ELECTRIC PRODUCTS CORP

P.O. Box 3216 4200 So Mendota St.
Madison 4, Wisconsin

NJPCA Fly Control Meet

Sanitation, control procedures, new insecticides and equipment were subjects covered at a fly symposium sponsored by the New Jersey Pest Control Assn. Over 150 PCOs, entomologists ,and public health officials attended the meeting held at the Rutgers University Experiment Station, New Brunswick, recently.

Guests attending included Dr. Ralph E. Heal, National Pest Control Assn. executive secretary; Dr. Bailey B. Pepper, director of Rutgers University's entomology department; John Zemlansky, chief sanitarian for the New Jersey State Department of Health; and Charles Faulk, president, and Ed Gerner, vice president, of the New Jersey Health Officers Assn.

Nevada PCOs Form Assn.

Nevada pest control operators have banded together to form the Nevada Pest Control Association. One of the main purposes of the new group is to protect the public from unethical business practices such as fraudulent advertising and shoddy work.

Association secretary is Robert M. Barton, Box 3168, North Las Vegas.

Hit Tobacco Beetles At Night

Stored tobacco insects in warehouses can best be suppressed by applying pyrethrum sprays or aerosols between 6 p.m. and midnight reports the Department of Agriculture's Agricultural Marketing Service. This time period coincides with the period of greatest activity of the cigarette beetle.

Usual practice in the tobacco industry, the AMS says, has been to apply these sprays during the normal working day. However, studies last season demonstrated that most of the cigarette beetles were in flight between 5 and 11 p.m. Thousands of beetles were caught in traps after 8 p.m. in warehouses sprayed earlier in the day.

Heads St. Louis Rat Control

John L. Sadowski has been appointed public health engineer in charge of the sanitation and rat control section of St. Louis, Missouri's City Health Division.

He was formerly manager of Orkin Exterminating Company's St. Louis office.

Dieldrin ant powder package is designed for resale to customers. It weighs only 3 ozs.

Dieldrin Ant Package

A possible PCO resale item is a consumer package of ant powder containing dieldrin being distributed by J. T. Eaton & Co., 1106 Lakeview Road, Cleveland, Ohio.

The package is a circular hand-squeeze applicator and weighs 3 ounces. Each package comes in a display unit that is designed for self-service sales.

Jasgo Disposable Aerosol

A new, 3-pound aerosol insecticide has been put on the market by Jasgo Chemical Co. The new "Wiff Wonder Bomb" container reportedly holds enough insecticide to treat 1,000,000 cubic feet and can be discarded when empty.

"Wonder Bombs" are said to be non-inflammable, non-toxic and non-injurious to humans or other warm blooded animals.

Additional details are available from the firm at 1129 St. Johns Place, Brooklyn, N. Y.

John Bean Sprayer mounted on motorcycle is being used in southern California to treat catch basins along street curbs for mosquitoes. According to the company, this is a "terrific labor saving device" in that the operator does not have to stop at each basin and then get out of a truck or car to spray. The attachment reportedly weighs only 180 pounds empty; about 450 full, and consists of 50 gallon tank and a Bean #61 pump giving three gallons per minute at up to 300 pounds pressure. Additional details can be obtained from John Bean Division, Food Machinery & Chemical Corp., Lansing, Mich.

Netherslands Antilles Honors Seven USDA Entomologists

Seven U. S. Department of Agriculture scientists who participated in the successful eradication of the screw-worm fly from the Caribbean Island of Curacao have been publicly commended for their work by the Governor of the Netherlands Antilles.

Documents signed by Governor A. A. M. Struycken have been received by Dr. B. T. Shaw, Administrator, Agricultural Research Service; Dr. A. W. Lindquist, Head, Insects Affecting Man and Animals Section; and members of the Section A. H. Baumhover, W. D. New, A. J. Graham, D. E. Hopkins, and F. H. Dudley.

The Department's Entomology Research Branch cooperated with Curacao authorities to determine whether or not the saturation of the natural screw-worm fly population with sexually sterile male flies would eventually eradicate this serious insect pest of livestock. Success of the eradication effort opens the way to a similar attempt against the screw-worm in southeastern U. S., the Department says.

Orkin Promotes Two

C. B. Anderson has been named new district manager for the state of Oklahoma for Orkin Exterminating Company and William C. Mills has been elevated to manager of the firm's Decatur, Ala., office, announces company headquarters in Atlanta.

A former manager of the company's Nashville, Tenn., branch, Anderson has been with Orkin since 1943. He will be headquartered in Oklahoma City.

Mills, a graduate of Alabama Polytechnic Institute, was previously in the firm's Mobile, Ala., office. He joined Orkin two years ago.

Maclean Fumigators' Guide

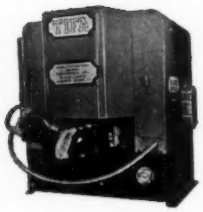
An informative 4-page bulletin designed to aid PCOs expecting to take state structural pest control board examinations involving fumigants has been issued by the Neil A. Maclean Co., Los Angeles, Calif.

Operators desiring a copy of this concise, informative pamphlet should contact the firm at 184 So. Alvarado St.

TIFA

is still the best!

For continuous satisfactory results depend on TIFA — first in the field and successfully used for more than 10 years in pest control.



"TIFA"

Todd Insecticidal Fog Applicator carrying Underwriters' Listing Seal.

Send us your questions. Ask for folders

Products Division

TODD SHIPYARDS CORPORATION

Headquarters: **Columbia & Halleck Streets, Brooklyn 31, N.Y.**
Plant: **Green's Bayou, Houston 15, Texas**

FOR RATS

QUICK ***SURE***

ONE SHOT KILLS

GLOBE BRAND

THALLIUM SULPHATE

—•—

1 - 4 lbs. . . . . $13.00/lb.
5 - 9 lbs. . . . . $11.50/lb.
10 - 24 lbs. . . . . $10.50/lb.
25 lbs. or more . . $ 8.00/lb.

—•—

All prices F.O.B. Denver with transportation charges allowed to U.S.A. destinations.

Prices subject to change without notice.

NOW AVAILABLE — FREE FOLDER DESCRIBING EFFECTIVE BAIT FORMULATIONS. WRITE DEPT. LM.

AMERICAN SMELTING AND REFINING CO.

120 Broadway **New York 5, New York**

MR. PCO...THIS IS IT

THE TIME OF THE YEAR WHEN

★ Everyone is Moth and Carpet Beetle Conscious;
★ Valuable Rugs and Carpets are being protected from Moth and Carpet Beetle damage;
★ Large Profits are being made by aggressive **PCO's** who are mothproofing and giving **PER-MO's 5-YEAR** Written Guarantee.

PER-MO MOTHPROOFING INCREASES YOUR PROFITS!

Most PER-MO dealers easily show **500% PROFIT** on Mothproof Service Work . . . In addition, we help you sell Mothproofing by giving you **FREE** envelope stuffers and other dealer aids.

We give your customers a **WRITTEN GUARANTEE** that their rugs and carpets won't be damaged by moth or carpet beetle larvae for at least **5 YEARS** . . . In case of damage, **PER-MO** assumes **100% OF LIABILITY**. . .

Water-base type of liquid, **EASY-TO-USE,** harmless, **WILL NOT SPOT OR STAIN** . . . Odorless, and causes **NO INCONVENIENCE** while Mothproofing in a home . .

— Some Other PER-MO Products —
• Flameproof Liquid • Arsenic Rat and Mice Liquid • • Red Squill Rat Bits and Rat Paste • Antu Rat Paste • • "Chek" Deodorant •

PER-MO
STANDS THE TEST
IT'S BY FAR THE BEST

WRITE TODAY FOR FULL DETAILS
On any or all products!

OUR 20th YEAR

PER-MO PRODUCTS CO.
Dept. P. 59, 1715 E. 36 St. Kansas City, Mo.

NEW! Internal Pressure Seal Designed
1 GALLON UNIT offered for the first time
Exclusive with PCE

A 1-gallon job that is frankly the best value we have ever offered in a sprayer.

And, if you already own a PCE tank-type sprayer, you'll be glad to know that spare parts are interchangeable with other stainless steel tank-type sprayers in the PCE line.

AS ILLUSTRATED $26.50

WITHOUT GAUGE $24.50

as shown plus coupler at valve end of hose $30.00

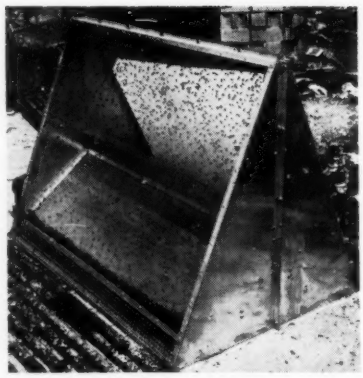
PEST CONTROL EQUIPMENT COMPANY
24 N. Bond Street **MO-8-1197** **MT. VERNON. N. Y.**

Smo-Cloud residual aerosol insecticide is said to kill roaches, waterbugs, bed bugs, silverfish, flies, ants, mosquitoes, moths, spiders and wasps. Formulation contains 0.5% lindane and 0.5% pyrethrum. Smo-Cloud is manufactured by Continental Chemiste Corporation, located at 2068 West Ogden Avenue, Chicago 12, Illinois.

List of Film Libraries Cooperating With USDA

Here is a list of the film libraries that cooperate with the U. S. Department of Agriculture in distributing Department films. Write the location nearest you for information on any USDA film.

Extension Service Ala. Polyt. Inst., Auburn, Ala.
Extension Service, Univ. of Alaska, College, Alaska.
Visual Aids Bureau, Univ. of Ariz. Tucson, Ariz.
Extension Division, Ark. State College, Conway, Ark.
Extension Service, P. O. Box 391, Little Rock, Ark.
Extension Division, Univ. of Calif., Berkeley 4, Calif.
Ext. Div. of Calif., 10851 Le Conte Ave., Los Angeles 24, Calif.
Bureau of Audio-Visual Instr., Univ. of Colo., Boulder, Colo.
Extension Service, Colo. A. & M. College, Fort Collins, Colo.
Audio-Visual Center, Univ. of Conn., Storrs, Conn.
Dept. of Rural Communications, Univ. of Delaware, Newark, Del.
Film Section, D. C. Public Library, Washington 1, D. C.
Dept. of Visual Instr. Univ. of Fla., Gainesville, Fla.
Georgia Agric. Extension Service, Athens, Ga.
Audio-Visual Aids Service, Univ. of Ga., Athens, Ga.
Extension Service, Univ. of Hawaii, Honolulu 14, T. H.
Extension Service, State House, Boise, Idaho
Visual Aids Service, Univ. of Ill., Champaign, Ill.
Audio-Visual Center, Indiana Univ., Bloomington, Ind.
Audio-Visual Center, Purdue Univ., Lafayette, Ind.
Visual Instruction Service, Iowa State College, Ames, Iowa.
Bureau of Visual Instruction, Univ of. Kans., Lawrence, Kans.
Extension Service, Kans. State Colege, Manhattan. Kans.
Bureau of Audio-Visual Aids, Univ. of Ky., Lexington 29, Ky.
Extension Service, La. State Univ., Baton Rouge 3, La.
Extension Service, Univ. of Maine, Orono, Maine.
Extension Service, Univ. of Md., College Park, Md.
Audio-Visual Center, Univ. of Mass., Amherst. Mass.
Audio-Visual Education Center, Univ. of Mich., Ann Arbor, Mich.
Audio-Visual Center. Mich. State College, East Lansing, Mich.
Institute of Agriculture, Univ. of Minn., St. Paul 1, Minn.
Audio-Visual Education, State Dept. of Ed., Jackson, Miss.
Extension Service, Miss State College, State College, Miss.
Visual Education Dept., Univ. of Mo., Columbia, Mo.
Extension Service, Montana State College, Bozeman, Mont.
Montana State Film Library, Mitchell Bldg., Helena, Mont.
Bureau of Visual Instr., Univ. of Nebr., Lincoln 8, Nebr.
Extension Service, Univ. of Nev., Reno, Nev.
Audio-Visual Center, Univ. of N. H., Durham, N. H.
Audio-Visual Dept., Rutgers Univ., New Brunswick, N. J.
New Jersey State Museum, State House Annex, Trenton 7, N. J.
Museum Film Service, Museum of New Mexico, Santa Fe, N. M.
Extension Service, N. M. A. & M. College State College. N. M.
Film Library. State Dept. of Com., 49 Howard St., Albany ,7 N. Y.
Extension Service, College of Agric. Cornell Univ., Ithaca. N. Y.
Bureau of Visual Education, Univ. of N. C., Chapel Hill, N. C.
Extension Service, N. C., State College, Raleigh, N. C.
Extension Service, N. Dak Agric. College, Fargo, N. D.
Extension Service, College of Agr., Ohio State U., Columbus 10, Ohio.
Audio-Visual Education, State Dept. of Education, Columbus 15, Ohio.
Film Section, Columbus Public Library, Columbus 15, Ohio.
Audio-Visual Education Dept., University of Oklahoma, Norman, Okla.
Extension Service, Okla. A. & M. College, Stillwater, Okla.
Dept. of Visual Instruction, Oreg. State College, Corvallis, Oreg.
PCW Audio-Visual Materials Center, Pittsburg, 32, Pa.
Agr. Extension Div., Pa. State Univ., State College, Pa.
Extension Service, Univ. of Puerto Rico, Rio Piedras, P. R.



Smith Poly-Gruv Fly Trap is said to be capable of catching over 50,000 flies per day. Made of aluminum, the new trap is reportedly simple in design, easy to clean and maintain, completely portable, and rugged enough to withstand years of use. Measuring 4' long, 3' high and 32" deep, it is recommended by the manufacturer for use in highly populated fly areas such as food and meat packing plants, dairies, stockyards, etc. According to the manufacturer, the trap uses a specially prepared non-poisonous fly lure which attracts and traps the flies which die within 12 hours because of lack of water. For further information, contact Fly Control Corporation, 420 South Lawton, Tulsa, Okla.

The Library, Univ. of Rhode Island. Kingston, R. I.
Extension Service, Clemson Agr. College, Clemson, S. C.
Audio-Visual Aids Bureau, Univ. of S. C., Columbia 19, S. C.
Film Library, S. Dak. State College, College Sta., S. Dak.
Extension Div., Univ. of S. Dak., Vermillion, S. Dak.
Div. of Univ. Ext., Univ. of Tenn., Knoxville 16, Tenn.
Visual Instruction Bureau, Univ. of Texas, Austin 12, Tex.
Extension Service, Texas A. & M. College, College Sta., Tex.
Audio-Visual Div., State Agric. College, Logan, Utah.
Vt. State Film Library, Univ. of Vt., Burlington, Vt.
Extension Service, Va. Polytechnic Inst., Blacksburg 12, Va.
Bureau of Teaching Materials, State Board of Ed., Richmond, Va.
Office of Visual Ed., Central Wash. College of Ed., Ellensburg, Wash.
Audio-Visual Center, State College of Wash. Pullman, Wash.
Audio-Visual Aids Dept., W. Va. Univ. Library, Morgantown. W. Va.
Bur. of Visual Instruction. Univ. of Wis., Madison 6, Wis.
Wyoming Film Library, Univ. of Wyo., Laramie, Wyo.

NEW ... and IMPROVED
WELL CONSTRUCTED
POWDER GUN
60¢ EACH
F.O.B. Atlanta, Ga.
Plus Parcel Post
and Sales Tax
Where Applicable

For further information write:
Purchasing Department
ORKIN EXTERMINATING CO., INC.
713 West Peachtree St., N.E.
Atlanta, Georgia

WORLD'S LARGEST PEST CONTROL COMPANY

MICE - GLUE
GETS MICE LIKE FLYPAPER GETS FLIES
7½ lbs. $1.00 per lb. 25 lbs. $.90 per lb.
100 lbs. $.80 per lb.

BIRD - REPELLENT
Keep Pigeons, Starlings and Other Birds from Buildings
7½ lbs., $1.00 per lb. 25 lbs., $.90 per lb.
100 lbs., $.80 per lb.

PEST CONTROL CHEMICAL CO.
324 Broadway Write for details Buffalo, N. Y.

New Government Publications

Here are six more publications recently released by the U. S. Government that will be of interest to pest control operators. Bulletins available from the Government Printing Office, should be addressed, Supt. of Documents, Government Printing Office, Washington, D. C. For Department of Agriculture material write to the Department at Washington 25, D. C. Make sure that title and catalog numbers are included in your request. Send check or coin, no stamps.

Roof Rat Populations in Southwest Georgia. 1955. 20 p. Catalog No. FS 2.62:27. Available from Govt. Printing office for 20c.

Poultry Mites, How to Control Them. 1955. 8 p. Catalog No. A 1.35:383. Available from Govt. Printing Office for 5c.

Insects and Diseases of Vegetables in the Home Garden. 1955. Home and Garden Bulletin No. 46. Available free from the U. S. Department of Agricuture.

Spray Distribution With Boom Sprayers. 1955. 7 p. ARS-33-8. Available free from the U. S. Department of Agriculture.

Preliminary Tests With Some N-Substituted p - Ethoxybenzamides for Synergistic Action In Allethrin Fly Sprays. 1955. 6 p. ARS-33-9. Available free from the U. S. Department of Agriculture.

Timing of Sprays to Control the Cigarette Beetle. 1955. 6 p. AMS-49. Available free from the U. S. Department of Agriculture.

CSMA Proceedings Available

Printed copies of the proceedings of the 41st annual meeting of the Chemical Specialties Manufacturers Association, Inc., held in New York City last December, are now available.

Containing a complete transcript of all general, divisional, and special committee meetings, the 210-page, spiral bound record is priced at $7.50 per copy postpaid in the U. S. and Canada, and $8 a copy postpaid to other countries. Over 50 technical papers and reports presented at the 1954 meeting are included in the publication.

Orders should be addressed to the Secretary, Chemical Specialties Manufacturers Association, 50 East 41st St., New York, N.Y.

Calspray Dry Fly Bait

A new malathion dry bait that is said to kill both resistant and non-resistant house flies more economically and with less risk to the applicator is being manufactured by California Spray Chemical Corp., Richmond, Calif.

According to the company, two reasons for the efficiency of this bait is its larger particle size and an "attractant" more effective than sugar-based formulas.

Best results are obtained when the bait is applied early in the morning, allowing flies a full day of exposure, the company says. An application of the bait will reportedly continue to kill flies for several days out-of-doors, and up to a week in enclosed areas.

1955 model Chapin 'Slide-Spray'' slide pump sprayer is said to be more efficient in operation and give longer product life than previous models. Full details on the sprayer can be obtained from the R. E. Chapin Manufacturing Works, Inc., of Batavia, New York.

Technical Formulations Book

Sampling, isolation, and determination, including residue methods, are all covered in a text just issued by Interscience Publishers, 250 Fifth Avenue, New York 1, N. Y. Entitled **Analysis of Insecticides and Acaricides**, the 708 page book contains 72 illustrations and 50 tables.

General part of the book deals with presampling considerations, sampling procedures, the analysis itself, and the interpretation of data, applied to the general problems of composition analysis of technical grade materials. A special section of the text presents analytical procedures for determining approximately 90 insecticides and acaracides of contemporary interest.

Copies of the book are available from the publisher for $14 each.

Penn Salt Moves

Effective the first of August, Pennsylvania Salt Manufacturing Co. has moved from 1000 Widener Building to 3 Penn Center Plaza, both in Philadelphia.

MGK Opens New York Office

McLaughlin Gormley King Co., of Minneapolis, Minn., has opened an eastern office at 21 East 40th St., New York 16, N. Y. Nathan D. Froot is manager of the newly created branch.

The New York office will handle sales for the New York, New England, and middle Atlantic areas.

Calendar

National Agricultural Chemicals Assn. Annual Meeting, Spring Lake, N. J., Sept. 7-9.

Eastern Pennsylvania Pest Control Assn., Inc., Monthly Meeting, Sylvania Hotel, Philadelphia, Sept. 8.

Pest Control Assn. of Western Pennsylvania Monthly Meeting, Pittsburgh, Sept. 8.

Tennessee Pest Control Assn. Annual Meeting, Andrew Jackson Hotel, Nashville, Sept. 10-11.

Professional Exterminators Assn. Monthly Meeting, Museum of Natural History, New York City, Sept. 12.

American Institute of Baking Special Course in Bakery Sanitation, Chicago, Ill., Sept. 19-22.

Iowa Pest Control Assn., Inc., Meeting, Blackhawk Hotel, Davenport, Sept. 22-23.

Assn. Of Master Pest Control Operators of Dayton Monthly Meeting, Dayton, Ohio, Sept. 28.

Baking Industry Exposition, Convention Hall, Atlantic City, N. J., Oct. 1-6.

National Pest Control Assn. Convention, Cosmopolitan Hotel, Denver, Colo., Oct. 16-20.

Arkansas PCO Licensing Examinations, State Plant Board, Little Rock, Nov. 7.

American Public Health Assn. 83rd Annual Meeting, Municipal Auditorium, Kansas City, Mo., Nov. 14-18.

Entomological Society of America Annual Meeting, Netherlands Plaza Hotel, Cincinnati, Ohio, Nov. 28-Dec. 1.

Nebraska Assn. of Pest and Termite Control Operators, Inc., Meeting, Lincoln Hotel, Lincoln, Dec. 2.

Chemical Specialties Manufacturers Assn. 42nd Annual Meeting, Roosevelt Hotel, New York City, Dec. 5-7.

Weed Society of America Meeting, Hotel New Yorker, New York City, Jan. 4-6.

North Carolina Pesticide School, Raleigh, Jan. 10-11.

North Carolina PCO Short Course, State College, Raleigh, Jan. 31-Feb. 4.

National Sanitary Supply Assn. 33rd Annual Convention and Trade Show, Conrad Hilton Hotel, Chicago, Apr. 29-May 2.

Notebook

TIPS AND IDEAS FROM THE FIELD

Termites On a Wet Tin Roof

By Walter S. Buswell, Jr.

Recently our service department received a call from the Holy Cross Academy on Upton Street, N. W., Washington, D.C. They stated they were taking off a wood roof which covered the sixth floor of the building. While they were taking the roof off, their carpenters found an infestation of termites.

Having been through this building on other occasions, I doubted that the insects could be termites. My doubts were founded on the fact that the structure was poured concrete and brick. The roof was a minimum of 70′ from the ground. Further, our regular service department had never spotted a condition in the past seven years.

As I rode up the elevator, I wondered what kind of problem I would actually be confronted with.

Upon inspection, I found that there was actually a subterranean termite problem which had done a considerable amount of damage. The wood roof had been built five years before over the top of a slag roof. Over the wood structure had been laid tin and slag.

The drainage on the roof was very poor with the result that the wood was soaked. Apparently the tin and slag had prevented any drying even during the very arid summer.

A check of the basement area 6 floors below revealed no evidence of termites.

The following morning I invited termite authority, Dr. Thomas Snyder to take a look at this unusual condition. Mr. Jack Mitchell, our service foreman, and Mr. Kilmer Bortz, our sales representative, joined Dr. Snyder and myself. Mr. Mitchell and I checked the 14″ crawl space areas under two adjacent roofs and found that an old condition of termites had structurally weakened an area of approximately 20 square feet. The wood under these two roofs was dry and no live termites could be found.

Dr. Snyder concluded that the active termite colony had originated from a swarming that was able to establish itself in the moist wood. He recommended removal of wood. Although I believed this to be an unparalleled infestation, Dr. Snyder stated similar conditions had been found in a few other sections in the United States. (In the Oct. '52 issue of **Pest Control**, p. 38, PCO Robert Schendel, of Shendel's Pest Control, Topeka, Kansas, reported a subterranean termite infestation on top of a building 50′ high at Muskogee, Okla.) The fact that the wood roof was built only five years ago, and considering the amount of damage and size of the active colony, made this condition unique in my termite experience.

New Martindale Catalog

Martindale Electric Co., of Cleveland, Ohio, has just released a new 64-page catalog describing its many products. Liberally illustrated, the publication carries specifications, prices and descriptive information.

This catalog may be obtained by writing Martindale at 1367 Hird Ave., Cleveland 7.

knock-out the odor in Insecticides and other strong-smelling Chemical Specialties with CHLORSCENT

CHLORSCENT was especially developed to quickly, efficiently and economically cover and neutralize the unpleasant odors so often present in insecticides and other chemical specialties used in pest control operations. Why not test CHLORSCENT in your own products. We'll be glad to send a free sample on request, or ship you a pound at the low, low price of $1.60.

reodorize 1 gallon of insecticide for only 2 1/2 cents

AROMATIC PRODUCTS
INCORPORATED
15 East 30th Street, New York 16
Chicago, Dallas, Memphis, Pittsburgh, Los Angeles, Boston

The Biggest

"SHOW" of the Year

will appear on the advertising pages of

PEST CONTROL's

October NPCA Convention Issue

to be distributed at the
National Pest Control Association Annual Convention, Denver, Colorado, October 16-20

Everybody, but every pest control delegate will stop to look at the chemicals, equipment and supplies displayed on the advertising pages of this big SHOW issue. Everyone attending the meeting will be given a free copy of **PEST CONTROL'S** October **CONVENTION ISSUE** and copies will be mailed to other pest control firms whether subscribers or not.

This is the *One, Best Way* to be sure your sales story is **seen, read, saved** and **taken home!** There will be no advertising in the convention program.

Solid Reader Interest. Never before have we printed an issue loaded with so many live-wire photographs readers will save and save and save. New pest control problems in modern-day home construction, a comprehensive study of carpenter ants, signs of infestation—are but three of the terrific feature articles headlining the profusely-illustrated October convention issue of PEST CONTROL. **Advertisements will be seen over and over again because of the long life value of this outstanding number.**

Over 5,000

will see your advertisement

Products advertised in our October issue will have the **largest audience** ever provided PEST CONTROL advertisers—25% over our 4,000 guaranteed paid circulation—and at no extra cost!

Reserve Space Now!

FINAL CLOSING DATE: SEPT. 20

See you in the BIGGEST SHOW ISSUE of the Year:
PEST CONTROL for OCTOBER

PEST CONTROL

1900 Euclid Ave. Cleveland 15, Ohio

Infestation Report

Contains pertinent portions of the Department of Agriculture's **Cooperative Economic Insect Report**, material from university entomology departments, and reports from readers. PCOs noticing infestations in their own areas are urged to communicate with **Pest Control** so their information may be added to this infestation report.

A CONENOSE BUG
(Triatoma protracta)

Arizona: Several household infestations in Maricopa and Yavapai Counties.

A SUBTERRANEAN TERMITE
(Reticulitermes virginicus)

New York: Collected in May at Great Neck, Nassau County, New York by Philip Mayer. According to ARS records, this is the first report of this insect from New York.

BLOODSUCKING CONENOSE
(Triatoma sanguisuga)

Florida: Adult collected from home in Alachua.

CARPENTER BEES

Tennessee: Damage to several buildings.

CATERPILLARS

New York: Infesting lawns, gardens, and trees around Levittown.

CICADA KILLER)
(Sphecius speciosus)

Kansas: Counts of wasps at a concentration in Manhattan ranged from 150 to 200. Some destruction of lawns occasionally. Active in several areas of state.

CHIGGERS

South Carolina: Heavily infested area at Clemson. **Minnesota:** Abundant in many parts of state. **Maryland:** Severe in upper Baltimore County.

DERMESTIDS

Virginia: Damaging stored and cured hams in a Tazewell County home. **Utah:** Infesting damp wheat at Salina.

FLEAS

Missouri: Heavily infesting numerous lawns in central area. **Pennsylvania:** Light infestations in homes in Columbia and Lycoming Counties and a heavy infestation in and around a home in Centre County. **North Carolina:** Fleas on dogs unusually prevalent especially in Wake County. **Tennessee:** Abundant on pets and around homes over state.

FLIES

Kansas: Fly populations have increased to very high levels recently.

HOUSE FLIES

New Mexico: Very numerous at Las Vegas. **Maryland:** Very troublesome in dairy and beef barns in most sections. **South Dakota:** Rapid increase following hot, humid weather. **Kansas:** Populations have increased to very high levels.

LESSER GRAIN BORER
(Rhizopertha dominica)

Colorado: Noticeable increase in stored-grain insects particularly the lesser grain borer.

MITES

Oklahoma: Unusually numerous in Oklahoma County.

MOSQUITOES

California: Continued increase in Fresno, Kings and Tulare Counties. **Minnesota:** Large brood recently emerged in Twin Cities area. **Nevada:** Very abundant in northeastern area. **Rhode Island:** Abundant over state. **Colorado:** High populations of adults reported from a number of communities of eastern area. **Florida:** Averaging 2 to 3 bites per minute in Dade County.

OLD HOUSE BORER
(Hylotrupes bajulus)

Pennsylvania: Some exit holes in siding of a 4-year old house in Columbia County.

RED HARVESTER ANT
(Pogonomyrmex barbatus)

Oklahoma: Mating swarms seen recently. Swarming occurred over a wide area.

STORED GRAIN INSECTS

Idaho: Most farm-grain storages in Boundary and Bonner Counties infested with stored grain pests. Mainly dermestids, fungus beetles and granary weevils.

STRAWBERRY ROOT WEEVIL
(Brachyrhinus ovatus)

Delaware: Numerous adults entering houses in Newark. **Rhode Island:** Moderate numbers invading homes in Wakefield area. **Pennsylvania:** Moderate to heavy scattered infestations in homes in northeastern areas and abundant in a home in Lancaster County. **Minnesota:** Causing annoyance by entering buildings throughout state. **Wisconsin:** Invading many homes in Sheboygan County.

TERMITES

Wisconsin: Infesting homes in Sheboygan County. Termite tubes found on young, sound fruit trees. Also attacking old raspberry canes, cabbage stems.

GOOD LOOKING CASES ADD PRESTIGE TO YOUR JOB!

Standard 18"x12"x7" $10.85

Round 25"x8½" dia. for 3 gal. tank-type sprayer $10.85

Special No. 3 18"x8"x10½" $10.35

Attractive . . . low-priced . . . and soundly constructed for long use, these cases represent an unexcelled value! Mail your ORDER TODAY!

All inside dimensions shown are approximate

IN STOCK FOR IMMEDIATE DELIVERY

All prices F.O.B. Mount Vernon

PCE

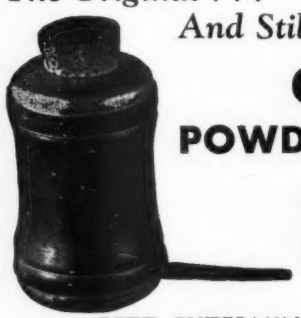
PEST CONTROL EQUIPMENT COMPANY

24 N. Bond Street Mt. Vernon, N. Y.

MO-8-1197

The Original . . .

And Still The Best!



GETZ POWDER BLOWER

75¢ EACH F.O.B. St. Louis, Mo.

GETZ EXTERMINATORS, INC.

2234 OLIVE STREET ST. LOUIS 3, MO.

Consultant

on the Control of Termites, Wood-Boring Insects and Wood Preservation

(1) Advice on Job $50.00 per day and expenses. ¼ day minimum.
(2) Agent to Consult Government Departments, Daily rate.
(3) Advice by Letter or Telephone $10.00 each, unless much Research Required, then Daily rate.

Dr. Thomas E. Snyder

2801 Adams Mill Road, N.W. Washington 9, D.C.

Telephone: DUpont 7-3757

Niagara Pyrenone Spray

A newly developed insecticide, which is said to be non-toxic, has been announced by Niagara Chemical Division of Food Machinery and Chemical Corporation. Known as Pyrenone 606 Spray, the new material is said to be the result of several years of development to provide an insecticide that is non-poisonous and non-injurious to man, livestock and foodstuffs.

Niagara Pyrenone 606 Spray is reportedly an oil-free emulsifiable concentrate containing 60% piperonyl butoxide and 6% pyrethrum. When diluted with water, it can be safely used in all food handling areas, Niagara says.

According to the manufacturer, the new spray has been accepted by the USDA for use in the food packing and canning industry. It reportedly kills on contact fruit flies, common flies, grain moths, gnats, roaches, silverfish, crickets, spiders, wasps, etc.

For information write Niagara at Dept. P, Middleport, N. Y.

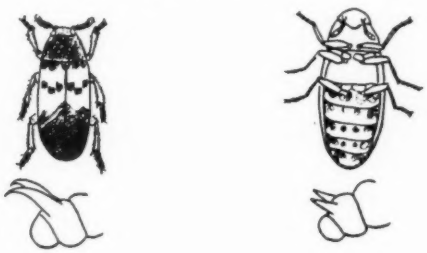
Primer

LOOK ALIKES: 9

Prepared by DR. MARION E. SMITH and HSIU-FU CHAO
Entomology Department, University of Massachusetts, Amherst

Larder Beetle and Incinerator Beetle

Insects that resemble each other are often hard to tell apart. This is the ninth in a series of illustrated columns which describe physical differences between pests that look alike. This month the authors tell how to correctly identify the larder beetle and incinerator beetle. In August, the drugstore beetle and cigarette beetle were covered. Keep these columns for a quick reference.



LARDER BEETLE Dermestes lardarius	INCINERATOR BEETLE Dermestes cadaverinus
Size	
About the same — adult about ¼ inch long; larva up to ½ inch or slightly more.	
Color	
Above: pale yellow stripe across base of wings; with several black spots in stripe. Below: uniform blackish.	Above: uniform black. Below: blackish, with four lengthwise lines of small indistinct black spots.
Larva	
Spines at end of body slender, slightly curved backwards and hooked at tip. No pale line.	Spines at end of body short, straight, not curved. May have a pale line down middle of back.
Food	
Animal products: ham, bacon, dried meat and fish, cheese; hair, furs, feathers, horn, honeycomb; dry insects, young birds; tobacco. Often bore into wood to pupate, but do not feed there.	Animal matter: dead birds, rodents, dry meat; silk, leather, dried mushrooms, etc.; debris in incinerators.

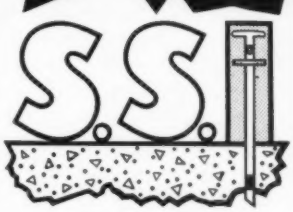
sh-h sh-h

the **OSS*** of the pest-control industry **is going underground**

*operation secret service

watch for the REVELATION next month on

S.S.



B&G

Manufacturers and Distributors of Pest Control Products

"Serving The Pest Control Industry"

B&G Company
PLUMSTEADVILLE, PA.
DEALER INQUIRIES INVITED

Ferguson Fumigants, Inc., spot fumigant is now on the market in two-inch high cans. Called Dawson Fumigant, Formula 73, it is a low dosage spot fumigant for the treatment of cereal handling and processing equipment to control stored products insects. Fumigant formulation is identical to that used by large milling organizations for insect control in equipment through the use of the "Little Squirt" spot fumigant applicator, Ferguson says. Another reported product advantage is that the use of small cans avoids possibility of glass breakage. Company headquarters is located in Ferguson, Mo.

TB Drug Is Weed Destroyer

Isoniazid, a drug developed for use in certain types of tuberculosis, has been found to halt the root growth of weeds when applied to the soil in amounts as low as 350 parts per million in water.

Because of the small concentrations required and the effect on the roots rather than the foliage of weed plants, researchers at the University of Michigan consider isoniazid an important discovery as a "pre-emergence" herbicide, one applied to the soil after the crop is sown, which destroys germinating weeds before the crop plants sprout.

Velsicol Forms New Company

Velsicol Corporation, of Chicago, manufacturer of chlordane, heptachlor, and endrin, has formed a separate company to handle its expanding foreign trade. The new firm will be known as Velsicol International Corp. and will be headed by E. T. Collinsworth, Jr. Mr. Collinsworth still retains his position as vice president and general manager of the parent company.

Matthews Joins New England

Jack M. Matthews is the new technical director of New England Pest Control Co., Providence, R. I. He formerly was director of research for Arwell, Inc., Waukegan, Ill.

Suppliers' Staff Changes

Wallace E. Gordon, former assistant director of sales for E. I. DuPont De Nemours and Company's Grasselli Chemicals Department, has been named director of the company's advertising department. He succeeds **William A. Hart** who retired last month. **W. James Latimore** becomes assistant director of sales.

Jack F. Patton has joined the field sales staff of Pennsylvania Salt Manufacturing Company's Laundry and Dry Cleaning Products Department in Charlotte, N. C. **Jack A. Cavanagh** is now sales representative in the company's Berkeley, Calif. office.

L. G. Smith has been appointed manager of Shell Chemical Corporation's newly-created distribution-operations department. In other company personnel shifts, **W. E. McCauley** becomes assistant to the sales manager, **C. C. Compton** takes over as manager of the sales development department, **H. H. Dodge** is new supervisor for the sales development department in the Midwest area with headquarters in St. Louis, and **J. F. White** heads Delta-Houston sales area which has its headquarters in Jackson, Miss.

Russell B. Stoddard has been assigned to the technical staff of Food Machinery and Chemical Corporation's chemical divisions administrative offices in New York City. He was formerly manager of the firm's Fairfield Chemical Division. **Robert H. F. Dade,** southeastern manager of FMC's Niagara Chemical Division, has been named to succeed Stoddard as manager of Fairfield.

Lewis Heads Sprayer Group

D. P. Lewis, secretary of H. D. Hudson Manufacturing Co., Chicago, was elected president of the National Sprayer & Duster Association at the group's annual meeting in Montreal, Canada, recently. Other association officers picked at the conference are: vice president, E. M. Myers, F. E. Myers and Brothers Co., Ashland, Ohio; and treasurer, P. L. Hauser, Root-Lowell Mfg. Co., Chicago.

Members elected to the executive board include: R. B. Chapin, R. E. Chapin Manufacturing Works, Batavia, N. Y.; R. M. Yoder, Dobbins Division, Chamberlain Corp., Waterloo, Iowa; R. W. Merritt, Root-Lowell Corp., Chicago; and T. M. Burton, D. B. Smith & Co., Utica, N. Y.

"Bug-Fog" insecticide is released by touching a match to contents of the can, says the manufacturer, Kissner Industries, Inc., of Madison, Wis. Product reportedly controls mosquitoes, gnats, flies, ticks, and other small flying insects for up to 3 days. Circled area shows "Bug-Fog" can. At bottom right is container giving off vapor. It is packaged as a retail item for over-the-counter sales.

3 Fined for Rodent Filth

Three more food companies have been cited and fined for violations of the Federal Food, Drug and Cosmetic Act. In each instance rodent filth contaminated the inspected food.

Ontario Cheese Factory Assoc., Smithville, New York had cheese containing insect, rodent hair, cow hair and manure fragments; made from dirty milk under unsanitary conditions. Fined $250.

Earl A. Cowger, t/a Cowger Sales Co., Superior, Nebraska, had shredded coconut, flour, and candy containing rodent excreta; held under unsanitary conditions. Fined $300 and court costs of $53.80.

S. D. Giacomo Co., and Vito Barzellone, Krebs, Oklahoma, were cited for rice, salt, hominy grits, cornmeal and pancake mix which contained rodent urine and rodent excreta; held under unsanitary conditions. Fined $250 each.

Improved Pestron Unit

Pestron spray units are now constructed of stainless steel to eliminate corrosion and extend the machine's life, the manufacturer, Pest Control Products Co., of Los Angeles, reports.

Other product advantages claimed by the company are elimination of any fire hazard, leaves no oily film on furnishings, requires no mixing of chemicals, and spray leaves no lingering odors.

Pestron lindane discharge units, which are said to require only one filling a day, can be used to control ants, bedbugs, carpet beetles, ticks, fleas, silverfish, roaches and clover mites.

Classifieds

When answering ads where box number only is given, please address as follows: Box number, c/o Pest Control, 1900 Euclid Avenue, Cleveland 15, Ohio.

Rates: "Position Wanted" 5c per word, minimum, $1.00. All other classifications, 10c per word, minimum $2.00 All classified ads must be received by Publisher at least three weeks preceding publication date and be accompanied by cash or money order covering full payment.

POSITIONS AVAILABLE

Experienced serviceman with salesmanship and managerial capabilities for general pest control in Pennsylvania, Ohio, Kentucky and W. Va. Must have good background, be honest and responsible. All replies confidential. Write R. D. Erdie, Ace Exterminators, Inc., Watson Hotel Building, Fairmont, W. Va.

POSITION AVAILABLE

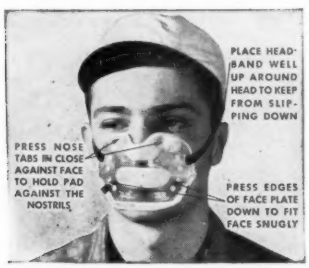
Sales-serviceman in Kansas. Salary, expenses, commission and vehicle furnished. Give experience. Box 384 Pest Control magazine.

POSITIONS AVAILABLE

World's largest pest control firm, operating in 27 states, needs several high-caliber men for responsible positions. Unlimited opportunities for ambitious, aggressive young men. Liberal salary and incentive arrangements. Employee benefits include paid vacations, sick leave, life insurance, hospitalization and pension plan. Experience in professions related to pest control helpful though not essential. Training programs for future managers and other supervisory positions open to college graduates, also several openings for service personnel. Replies confidential. Contact Technical Department, Orkin Exterminating Company, Inc., 713 W. Peachtree St., N.E., Atlanta, Georgia.

MARTINDALE

PROTECTIVE MASKS


PLACE HEADBAND WELL UP AROUND HEAD TO KEEP FROM SLIPPING DOWN
PRESS NOSE TABS IN CLOSE AGAINST FACE TO HOLD PAD AGAINST THE NOSTRILS
PRESS EDGES OF FACE PLATE DOWN TO FIT FACE SNUGLY

Clean, cool, comfortable, excellent protection against non-toxic dusts except free silica. Replaceable cotton pads are inexpensive and sanitary.

Protective Masks ..... $.30 ea.
No. 1 Refills (standard wt.) .02 ea.
No. 2 Refills (heavy wt.) .02½ ea.
Masks packed in individual envelopes. Refills packed 25 to a box.
No. 2 Refills (heavy wt.) contain twice as much filtering cotton as No. 1.

DISCOUNTS

Less than $10.00 list....Net
$10.00 to $24.99 list..10%
$25.00 to $99.00 list..15%
$100.00 and over ..20%
Minimum charge or C.O.D. ... $2.00
Minimum, cash with order .. $1.00

If payment accompanies order we will pay parcel post or express charges.

MARTINDALE ELECTRIC CO.
1367 Hird Ave. Cleveland 7, O.

POSITION AVAILABLE

Sales manager. Progressive midwest pest control firm looking for man with sales and promotion experience in termite control. Duties to include supervising, hiring and training salesmen, building up territories. Substantial salary commensurate with ability. Send full details to Box 385 Pest Control magazine.

POSITION AVAILABLE

Largest concern in Cuba has exceptional opportunity for well experienced man able to prepare formulations, supervise staff operators, assist in sales promotion and management. Knowledge of Spanish essential. Guaranteed future for right man. Reply giving past background and full details. Confidential. Box 388 Pest Control magazine.

POSITION AVAILABLE

Wanted salesman with executive ability for pest control in Kansas, Nebraska and Missouri. We offer the best possibilities for making money. District supervisor needed. Write Box 386 Pest Control magazine.

POSITION WANTED

Graduate chemist, 20 years experience in pesticides, disinfectants, cleaners, soaps, waxes and other sanitary chemicals desires position with company interested in manufacturing. Write to Box 380 Pest Control magazine.

WANTED

Will buy pest control business in Kansas, Missouri, Oklahoma, Nebraska or Colorado. Immediate action. Box 383 Pest Control magazine.

WANTED

Will buy small pest control business in Pennsylvania, Ohio, Kentucky and W. Va. Write details to R. D. Erdie, Ace Exterminators, Inc., Watson Hotel Building, Fairmont, W. Va.

WANTED

Tifa fogging machine. Write full particulars to Box 387 Pest Control magazine.

FOR SALE

Complete mosquito abatement business. Consists of 2 jeep mounted Tifas, unusual portable insecticide mixer, unique marsh oiling machine (uses waste oils), an urban fly larva control machine. Eighth year of operation, good reputation and following, unusual future opportunity. Will sell for 60 cents on dollar of original cost. Owner completing important patents in other fields. Box 382 Pest Control magazine.

Advertisers

SUPPLIERS' ADVERTISING IN SEPT.

Acme Protection Equipment Co. 30
Agricultural Specialties 7
American Cyanamid Co. 17
American Smelting & Refining Co. 41
Aromatic Products, Inc. 44
B. & G. Co. 3, 39, 47
Black J. Chemical Co. 31
Chapman Chemical Co. 21
Diamond Alkali Co. 25
Ewing Manufacturing Co. 33
Fairfield Chemical Division ..... 2nd cover
Getz Exterminators, Inc. 46
H. D. Hudson Mfg. Co. 25
Jasgo Chemical Co. 37
Larvacide Products Co. 50
Mar-Mel Products, Inc. 37
Martindale Electric Co. 49
McLaughlin Gormley King 23, 27
Michigan Chemical Co. 13
Mollen Chemical Co. 37
Motomco, Inc. 15
Napesco, Inc. 39
Orkin Exterminating Co. 42
Per-Mo Products Co. 41
Pest Control Chemical Co. 42
Pest Control Equipment Co. ..... 23, 41, 46, 4th cover
Pest Control Products Co. 30
John Powell & Co. 18
Prentiss Drug. & Chem. Co. 8
Shell Chemical Co. 4
Spraying Systems Co. 33
Syntron Co. 32
Todd Shipyards Corp. 41
United States Rubber Co. 29
Universal Electric Products 39
Universal Paper Products Co. 22
Vaccinol Chemical Co. 33
Velsicol Corp. ..... 3rd cover
B. & D. A. Weisburger 27
Whitmire Research Laboratories 34
Wood Treating Chemicals 11

Georgia PC Board Rules

Georgia Structural Pest Control Commission has drawn up a proposed 19-page list of minimum standards and regulations to govern PCOs.

Among the important provisions are: **1.** Requirement of a written contract between PCO and customer. **2.** All PCO equipment and places of business must be clearly marked with the license number. **3.** Servicemen must be supplied with identification.

Pestales

Nautical Nibblers: Those British beetles are sure class conscious. When they pick out a ship to chew on not any old ship will do. Oh, no! They have to choose the admiral's flagship. Of course this particular ship is made of wood and the admiral's been dead 149 years. Seems these busy beetles have been attacking the hull of Lord Nelson's flagship which got it's fame at the Battle of Trafalgar. It takes a bunch of insects to do what the whole French fleet couldn't.

* * *

Like PCO Fathers, *two sons are picking up the sprayer to carry on their family business. John, son of Larry Young who runs Speed Exterminator Co. in Cleveland, is studying entomology at Miami U., and works at pest control during the summer. Bill Kirchner's son, Bill, a senior at Miami, has gone into a three-way partnership with his dad's Cleveland Chemical, and is also using his vacation to get more practical experience.*

* * *

Tax Deduction: Imagine the face of the startled Internal Revenue Service employee who saw this deduction on an income tax return he was auditing, Mice--$20. Being a conscienceince 'servant of the people' the auditor hiked out to the taxpayer's home to get the matter straightened out. Guess he thought $20 would buy a lot of cheese. But it all turned out to be a big mistake. You see, "mice" was this fellow's abbreviation for "miscellaneous."

* * *

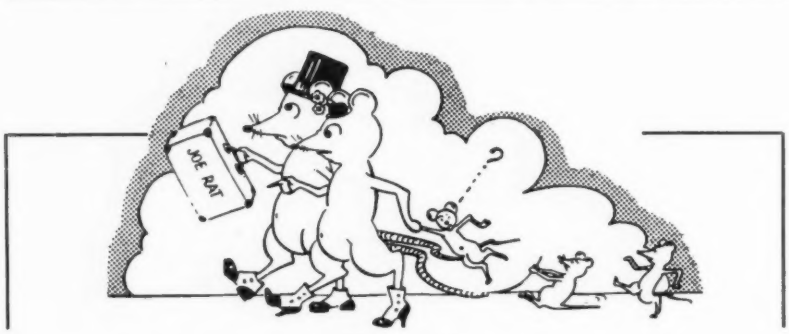
Commendations *for young Tom McCloud came from one of his competitors, M. S. Buckley, of Industrial Fumigant, recently. Tom runs W. B. McCloud & Co. in Kansas City, Mo., and "Buck" says Tom aggressively goes out and develops new business rather than cut prices to take away accounts from other firms in his area. It takes salesmanship and Tom's got it. Our industry needs more of this kind of selling.*

* * *

Mink vs. Moth: Here's another tax tale out of Washington. Seems that if the moth wasn't such a gentlemen and ate his meals so slowly you could claim a tax loss for a motheaten fur coat. But the Internal Revenue Service has ruled "the element of suddenness is not present in the loss a lady sustains when these pests do damage to her mink." Therefore the loss cannot be claimed, as it might be if the damage were the result of fire, storm or shipwreck, say the Treasury lads. Those boys in Washington are sure shying away from anything connected with mink these days.

* * *

It could be verse: *Leesburg, Fla. PCO Bill Clements and his wife, Margaret, are praying the judges think the limerick Bill submitted in a national contest is as clever as they do. If so, the Clements go to the Denver convention. Otherwise home they stay. Here's a bit of sound Yankee advice: Better wait for your prize money to take you to Leesburg when and if the convention's ever held there. It's a better bet. We'll miss you-all!*



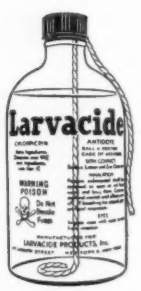
Larvacide's

CHLORPICRIN

UNIQUE ACTIVITY
Evicts families like this!

KILL—Space fumigation with Liquid LARVACIDE brings them out to die in the open. Then—sweep 'em up. No carcass nuisance. No waiting, as with baits.

AEROSOL LARVACIDE offers a still easier way. Open a valve and LARVACIDE spreads instantly to do the same job as liquid LARVACIDE. Takes less time to fumigate, and **less time to aerate.** May be applied from outside by using Larvasoler C.



IN BURROWS— Light dosage kills rats. Traces of gas linger to discourage rehabitation and burrows usually fall in before any newcomers arrive.
To repel rodents indoors, insert soft string into LARVACIDE bottle, letting part hang down outside as wick. One bottle serves 500-800 square feet of space. **Write for Bulletin No. 1004.**

Melvin Laboratories, Memphis, Tenn., report on their experience with the LARVACIDE wick bottle method in large Southern rice mill:

"During December when rats are driven indoors for food, by placing bottles at strategic points in warehouse of 4,000 sq. ft., the building was kept entirely free of rodent entry for one month at a cost of only $8.00."

REMEMBER — LARVACIDE's unmistakeable warning makes it safer to use.
Write for literature giving information every P.C.O. should have

You'll find the 12 bottle carton very convenient to carry in your car for unexpected needs.

Larvacide Products, Inc.
117 LIBERTY STREET NEW YORK 6, N. Y.
WEST COAST: 1515 Third Street San Francisco, Calif.

A Growing New Market for PCO's

CHLORDANE

...for turf insect control around landscaped plants and offices

WITH industry flocking to the suburbs, insects are now chewing up millions of dollars more in lawns, shrubs and flowers around these newly landscaped grounds. Why not go after this extra "outdoor business"?

Without requiring high-priced application equipment, CHLORDANE kills destructive insects with complete safety to turf and gardens. *Write today for proven suggestions on establishing a profitable outdoor-insect control program.*

CHLORDANE KILLS ALL THESE INSECTS:

- Fleas
- Lawn Moths
- White Grubs
- Chinch Bugs
- Japanese Beetle Larvae & Adults
- Cutworms
- Grasshoppers
- Ants
- Chiggers
- Earwigs
- Wireworms
- Armyworms
- Spiders
- Cockroaches
- Carpet Beetles
- Mosquitoes
- Clothes Moths
- Wasps
- House Flies
- Termites
- Silverfish
- Maggots
- Flea Beetles
- Mole Crickets
- Thrips
- Strawberry Crown Borer
- Seed Corn Maggot
- Strawberry Root Weevil
- Sod Webworms or Lawn Moths
- Spittle Bugs
- Box Elder Bugs
- Crickets

VELSICOL CHEMICAL CORPORATION **VELSICOL**

REPRESENTATIVES IN PRINCIPAL CITIES

General Offices and Laboratories 330 East Grand Avenue Chicago 11, Illinois

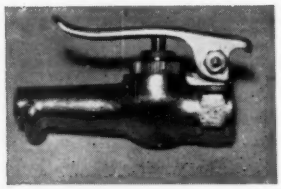
KLEER-FLO ROTO-PUMP

No drip! Self priming! Continuous flow! Goose neck spout prevents dripping and allows ample clearance for pumping into bulky containers. Capacity 5 to 10 gals. per minute. Accurately machined for a long life of trouble-free operation

No. R-10 $16.30

Includes bung nut for 1½" & 2" drum opening & suction pipe. If suction pipe is not required, please so state and deduct $1.80 from above price.

VALVES.



Standard on all PCE equipment, but will make any equipment better. Provides clean, quick on-off operation. Drop forged brass. Special internal parts to withstand the chemical action of the materials used by the PCO. For long, trouble-free service and low maintenance cost, use this superior valve. ¼ x ⅛ I. P. S.

Shut-off valve $2.95

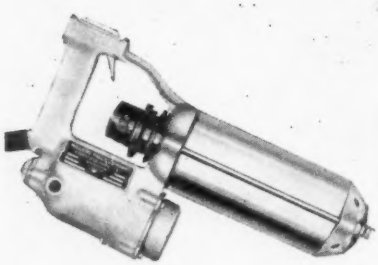
⅜" Quick-opening gate valve $9.70

PCE

QUALITY PRODUCTS ARE YOUR BEST BUY!

PEST CONTROL EQUIPMENT CO.

24 N. Bond St. MO-8-1197 Mount Vernon, N. Y.



ELECTRIC HAMMERS, ROTARY HAMMERS, DRILLS, SAWS, GRINDERS

P.C.E. are now distributors for Miller Falls Company, one of the largest makers of high quality tools. For tools of long life and trouble-free operation — buy Millers Falls tools. For better service to the pest control industry — buy through P.C.E. Write for Millers Falls catalogue today.

Write for catalog, an informative booklet of helpful aids for the busy PCO.

All Prices F. O. B. Mt. Vernon, N. Y.
All prices subject to change without notice.

LEAK-PROOF FLASHLIGHT BATTERIES

Guaranteed flashlight protection. If your flashlight is damaged by corrosion, leakage or swelling of this battery, a new comparable flashlight will be replaced free. Stays fresh. No dating necessary. Has shelf life of 2 years.

Case Lots Only (192 Batteries)

9¾c each

F.O.B. nearest Ray-O-Vac warehouse

Write for additional literature on any of the products shown above.

Printed in U. S. A.